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ABSTRACT

Papers on classification and subject cataloging which were presented at the 1983 International Federation of Library Associations (IFLA) conference include: (1) "PRECIS: Basic Principles, Function, and Use," in which Derek Austin (United Kingdom) describes the automated subject indexing system developed for use in the "British National Bibliography"; (2) "The PRECIS Project of the Deutsche Bibliothek [at] Frankfurt am Main," in which Bernd Maassen (West Germany) outlines project background and activities as well as criticisms of PRECIS; (3) "Computer-Aided Subject Cataloguing at the Deutsche Bibliothek in Frankfurt am Main," a review by Barbara Kelm (West Germany) of indexing principles, computer-generated indexing aids, central information services of the Deutsche Bibliothek, and possibilities for cooperative subject cataloging; (4) "Waiting for Technology: An Overview of Bibliographic Services in the Third World," in which Dorothy Anderson discusses the introduction of information technology and library development in the Third World; (5) "Problems in the Cataloguing of the Products of Rapidly Changing Technologies: With Special Reference to Machine-Readable Files" by Lenore Coral (United States), which discusses different methods for cataloging machine readable databases; and (6) "International Bibliographic Filing Principles and Rules" by Ernst Kohl (West Germany), which describes standardization of bibliographic filing rules and the development of International Standard ISO 7154. (ESR)

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Section: Classification and Subject Cataloguing

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PRECIS: basic principles, function and use

by

Dr Derek AUSTIN

Head, Subject Systems Office

British Library, Bibliographic Services Division

London, U.K.

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PRECIS: basic principles, functions and use

Introduction

There is no doubt that one of the principal factors leading to the development of PRECIS was a decision, taken around 1968/69, to automate the production of the *British National Bibliography (BNB)* from its first issues of 1971, using MARC records as the source of data. Since its beginnings, each issue of *BNB* has contained a main sequence of catalogue records arranged in classified order, supported by one or more alphabetical indexes offering access under the names of authors, titles, series, subjects, and so on. Most of the data comprising these sequences could be extracted without difficulty from their own uniquely identified fields or subfields in a MARC record, which meant that it should be possible to mechanize production using a relatively simple program to select and print the contents of the necessary fields in a pre-determined order. This did not apply to subject indexing data, however. None of the fields in the MARC records of that time had been assigned to index data of a standard regarded as adequate for a national bibliography. A number of indexing systems developed for use with computers were examined, but none of them seemed suitable, nor could we find a means, at that time, to computerize production of the chain index which had been a familiar part of *BNB* for almost 20 years. The editors of *BNB* therefore set up a special research project to re-examine the whole basis of subject indexing, having the computer in mind from the beginning *(1)*.

This research, which led to PRECIS, was established with five principal goals in mind:

- Firstly, it was decided that the computer should handle what might be called the 'clerical drudgery' aspects of indexing. We would expect an indexer to write a single string of terms which together summarise the subject of a document, and complete this string by adding instruction codes which tell the computer how and where each term should be printed. The computer would then take over: it would manipulate the single input

string into a full set of entries under selected terms, and it would regulate the typography, alphabetizing and filing of entries.

— Secondly, it was considered that each of the entries produced in this mechanical fashion should be co-extensive with the subject as seen by the indexer: that is to say, each entry should contain an equally complete summary of the subject. This can be seen in contrast to a traditional subject heading system, where an indexer sometimes assigns two or more headings to cover a complex subject, but cannot show how these separate headings were related to each other.

— Thirdly, the terms in every entry should be printed in what might be called a meaningful order — sufficiently close to natural language to allow the user to understand the subject without the need for complex instructions in how to use the index. We would, for example, deliberately avoid unnatural inversions, such as 'Bridges, concrete'.

— Fourthly, the order of terms in input strings, and in the entries generated from these strings, should be determined by a single set of logical criteria which can be applied with equal effect in any subject field, and also to any kind of document. Establishing a single set of criteria would not only allow easier teaching, but also simpler programming.

— Finally, it was decided that the terms selected as entry points in the index should be supported by a system of *See* and *See also* references from other related terms that might occur to a user but had been excluded from entries on the grounds that they were sufficiently implied. This would apply, for example, to broader terms and non-preferred synonyms. These references would be extracted by the computer from a machine-held thesaurus.

These five criteria appear at first sight to be quite formidable, but they can be divided conveniently into two simpler sets of related problems. The first four goals are concerned with the creation of an input string according to a general, unified logic, and the manipulation of the string into a set of meaningful, co-extensive index entries. We can refer to this as the syntactical side of the indexing language. The final goal dealt with the extraction of references from a machine-held

thesaurus. I shall concentrate in this paper on the syntactical side of PRECIS, partly because this offers a greater challenge from an international (and also multilingual) point of view; also because the PRECIS thesaurus is based upon general principles that are readily available in national and international standards on thesaurus construction *(2; 3)*.

Generation of entries from input strings

We encountered a few problems when we first tried to manipulate a single string of terms into a full set of entries capable of satisfying the various criteria considered ealier. Some of these problems, and their solutions, can be illustrated through an example of a string of four terms:

France - hospitals - electrical equipment - maintenance

It should be stated immediately that these terms have not been written in a random order. They are, in fact, written in the order required by the 'grammar' of PRECIS. A string of terms organised in this way possesses two important characteristics:

- Firstly, concepts are organised into what is called a *context-dependent order*. This simply means that each concept sets the next into its most obvious context, to the extent that 'France' sets the concept 'hospitals' into a geographical context, the concept 'hospitals' sets its 'electrical equipment' into a whole-part context, and this equipment was subject to the action 'maintenance'.

- Secondly, a string of terms organised in this way frequently forms what is called a *one-to-one related sequence*, meaning that each of the terms is directly related to the term (or terms) written on either side.

These two characteristics occur in many kinds of statement in natural language. One-to-one relationships, in particular, play an important part in conveying meaning, and in the present example these relationships are so strong that we can safely reverse the order of terms (leaving the one-to-one relations intact) without changing the meaning:

Maintenance - electrical equipment - hospitals - France

Reversing the order of terms in this way means that we have already generated two versions of the original string that are capable of satisfying the criteria considered earlier: each version is equally co-extensive, and they are equally meaningful. This will succeed, however, only when we try to generate entries under the first and last terms in the string. We begin to encounter problems if we try to generate an entry under a term selected from the middle of the string, such as 'electrical equipment'. It would be a simple matter to write a program which selects a middle term and prints it as the first word in the entry, followed by the rest of the terms in their original order:

Electrical equipment / France - hospitals - maintenance

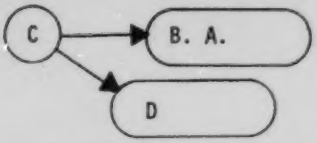
This immediately introduces an ambiguity, however — we can no longer tell with confidence whether the electrical equipment is being maintained in the hospitals, or whether it is used as a tool for general hospital maintenance. This ambiguity can be explained through reference to a natural tendency, on the part of the reader, to regard adjacent terms as related in a one-to-one sense. Consequently, when 'electrical equipment' is extracted and moved away from its original position, the mind tends to close up the gap and see a direct relationship between 'hospitals' and 'maintenance'.

This problem can be illustrated by a diagram:

— where 'A', 'B', 'C' and 'D' represent four terms, and the arrows show how a middle term, such as 'C', is related in a direct or one-to-one sense to the terms on either side: that is, 'B' and 'D'. The problem can then be phrased as a question: How can we maintain the correct one-to-one relationships between terms when we generate an entry under one of the middle terms, such as 'C'?

The search for an answer to this problem called for a new approach to the format of an index entry. Most index entries, including traditional subject headings, are printed on a single line (with a necessary allowance for overruns). We adopted a two-line format which

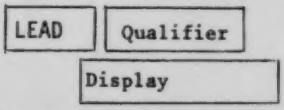
allows us to print closely related terms in adjacent positions:



If this format is applied to the string of terms considered earlier, the entry under 'electrical equipment' would appear in the form:

Electrical equipment. Hospitals. France
Maintenance

This format is characteristic of the majority of entries in a PRECIS index. It can be seen that the entry consists of three basic parts, each of which has its own name and its own special function:

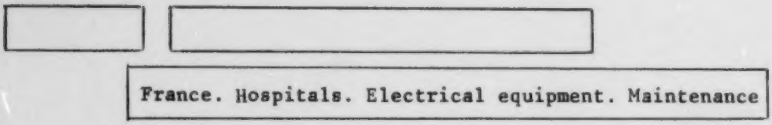


- The *lead* contains the term selected by the indexer as the user's access point to the index;

- The *qualifier* consists of one or more terms which set the lead into its wider context;

- The *display* contains those terms which depend on the lead for their context.

Apart from reducing the level of ambiguity in the index entry, this format also offered the basis for a relatively simple computer program to generate a set of meaningful entries out of a single string. This operation, which is known as 'shunting', can be applied, as a demonstration, to the string of four terms considered earlier. At the start of the shunting operation, we need to visualise the three parts of a PRECIS entry, and then assume that the string of terms, in context-dependent order, are held in the display position. The lead has not yet been occupied, and no entries have yet been generated:



To generate the first entry, the first term in the display is moved or shunted into the lead. The remaining terms in the display are then moved along to a standard indentation level:

France
  Hospitals. Electrical equipment. Maintenance

As soon as a term appears in the lead it is automatically printed in a distinctive typeface, such as roman bold. To generate the second entry, the term in the lead is shunted across into the qualifier, and the lead position is then occupied by the next term taken from the display:

Hospitals. France
  Electrical equipment. Maintenance

This operation could then be repeated twice more to generate the entries:

Electrical equipment. Hospitals. France
  Maintenance

Maintenance. Electrical equipment. Hospitals. France

Certain positions in an entry can sometimes be empty; it can be seen that the entry under 'France' does not contain a qualifier, and there is no display in the entry under 'maintenance'. In this example all the terms in the string were shunted successively through the lead, but the choice of leads is not left to the computer — it is entirely under the control of the indexer.

Some of the characteristics of these entries call for a brief review:

— Firstly, every entry satisfies the various criteria considered earlier; in particular, they are all equally co-extensive and meaningful.

— Secondly, as each term moves into the lead it appears within its own appropriate context. This is the feature of PRECIS which explains the name of the system — it is, in fact, an abbreviation for the *PRE*served *C*ontext *I*ndex *S*ystem.

The system also possesses a range of routines for generating entries in

different formats, but the majority of entries in any typical PRECIS index will almost certainly have been produced by this standard shunting procedure.

Introduction to the role operators

It is reasonably self-evident that this kind of procedure will generate sensible entries only if the terms in the input string were organised in the first place according to the principle of context-dependency. Unfortunately, a general principle of this kind is not sufficiently definite, of its own accord, to guarantee that a team of different indexers, or the same indexer on different occasions, will consistently achieve the necessary order in their strings. Indexers therefore work within the constraints of a kind of prescriptive 'grammar' which determines the order of terms without the need for an explicit reference to a principle such as context dependency.

The main components of the grammar of PRECIS are represented by the list of *role operators* reproduced as *Figure 1*. These operators are also supplemented by sets of special codes (not considered here) which regulate the forms of terms in index entries — for example, one group of codes allow the construction of an entry under any selected word in a compound term, and a further set of codes will generate correctly inflected terms in languages such as German and Polish. This is not an appropriate time to begin a course of instruction in PRECIS *(4)*, but at least we can see how the operators work by applying them to the subject considered earlier. For the sake of this demonstration we need to assume that an indexer has examined a document, and has reached the stage where its subject can be expressed in the form of a summary phrase, such as 'Maintenance of electrical equipment in French hospitals' *(5)*. This phrase can then be used as a basis during the next stage of subject analysis, when the indexer has to consider the role of each of its concepts, such as its function as a *location*, or an *action*, a *whole* or a *part*, and so on.

Indexers, during their training, are taught to check a subject

Primary operators

Environment of core concepts	0	Location
Core concepts	1	Key system *Thing when action not present. Thing towards which an action is directed, e.g. object of transitive action, performer of intransitive action.*
	2	Action; Effect of action
	3	Performer of transitive action *(agent, instrument);* Intake; Factor
Extra-core concepts	4	Viewpoint-as-form; Aspect
	5	Selected instance, *e.g. study region, sample population*
	6	Form of document; Target user

Secondary operators

Coordinate concepts	f	'Bound' coordinate concept
	g	Standard coordinate concept
Dependent elements	p	Part; Property
	q	Member of quasi-generic group
	r	Assembly
Special classes of action	s	Role definer; Directional property
	t	Author-attributed association
	u	Two-way interaction

Figure 1. PRECIS: schema of role operators

first for the presence of an action; if an action concept is present, it frequently determines the roles of the other concepts in the subject, just as the verb tends to dominate the sentence in natural language. In the present example, we can recognise 'maintenance' as a kind of action. The indexer then selects the operator which indicates an action: that is, the operator '2', near the top of the list in *Figure 1*. The operator is written as a prefix to the term:

(2) maintenance

The next step in analysis depends on whether this action is transitive or intransitive. Since the action 'maintenance' is transitive (that is to say, it is capable of taking an object), the indexer checks the other concepts in the subject statement, looking for the presence of the object. In the present example, this role is taken by the concept 'electrical equipment' (the class of things that was being maintained). If we check the list of operators we shall see that the object of a transitive action should be indicated by the operator '1'. Beyond this point, it is the operators, not the concepts, that determine the order of terms in the input string. Numbered operators are filed ordinally ('1' before '2', and so on), which means that the terms considered so far should be written in the order:

(1) electrical equipment
(2) maintenance

We now have to deal with a new kind of logical relationship. Although the concept 'electrical equipment' functions as the object of 'maintenance', it also shares a part-to-whole relationship with the concept 'hospitals'. Whenever this situation occurs, the name of the whole should be written before the name of its part, and the part is then indicated by the operator 'p' selected from the set of operators in the lower half of *Figure 1*. The numbered operator that was previously assigned to the term 'electrical equipment' should then be transferred to the name of the whole: that is, 'hospitals'. This would give us a three-term string:

(1) hospitals
(p) electrical equipment
(2) maintenance

Only one term, 'France', still remains from the original statement. Since

this term clearly indicates a location, it should be prefixed by the operator '0', taken from the top of the list in *Figure 1*. The final version of the string will then appear in the form:

(0) France
(1) hospitals
(p) electrical equipment
(2) maintenance

It can now be seen that the order of terms in this string, achieved by the application of a grammatical formula based on the role of each term, exactly matches the order seen in the earlier string, explained through reference to the general (and possibly arguable) principle of context dependency. Assuming that each of these four terms was chosen as a lead, this string will generate the same set of entries as those seen earlier.

I hope you will have realised that it is far more difficult to describe this technique than to apply it in practice. Most indexers would certainly agree that the hardest and longest part of their work consists in examining documents to determine their subjects, not in applying the PRECIS operators and codes. Once the subject of a document has been established, a trained indexer can express it very quickly in the form of a PRECIS string.

Fields of application, and forms of output

The use of PRECIS calls for an awareness, on the part of the indexer, of a few basic relationships between concepts expressed in terms of their roles, such as 'location', 'action', 'performer', and so on. We refer to these as the basis for the syntactical side of the system, but all these relationships are strictly logical rather than grammatical. They can occur in any text, without regard for subject field or discipline. This means that the indexers in an agency such as the British Library can apply the same basic techniques for subject analysis and coding to documents of any kind; not only works in different disciplines, but also different physical forms, including books, serials, audio-visual materials, and so on. Our authority files are also used as sources of data by outside agencies, such as the

British Universities Film Council, when producing their indexes to educational films. The new strings produced by these agencies are integrated into the British Library authority file, and can be used by any indexer *(6)*.

PRECIS is probably most familiar in the form of indexes to national bibliographies, such as *BNB* and the *Australian National Bibliography*. In these and other cases it is used as a two-stage index — that is to say, the entries in the subject index refer to classification numbers, and the user has to trace catalogue entries in a separate classified sequence. An example of this kind of output is shown in *Figure 2*, taken from an index to films where UDC numbers are used as pointers to the classified file. This sample contains not only entries generated from strings, but also *See* and *See also* references extracted from the machine-held thesaurus — it can be seen that both kinds of output are filed as a single alphabetical sequence.

Some of the more recent users of PRECIS have preferred a one-stage index, where each entry in the index is followed immediately by a brief catalogue entry, so that it resembles, in some respects, a traditional subject heading system. This certainly saves the time of the user in most (but not all) cases, and it occupies far less space than we had expected. An example of this kind of output, taken from the *British Education Index* (an index to journal articles in the field of education), is shown as *Figure 3*. A one-stage PRECIS index to the printed books received by the Reference Division of the British Library will shortly be issued on fiche. The same approach has also been adopted by the National Film Board of Canada in their printed catalogues of films, and it will also be used in an experimental PRECIS index being prepared by the Deutsche Bibliothek in Frankfurt — Dr Maassen will refer to this in the next paper.

Although PRECIS was developed originally as a source of printed indexes, it has also shown its value in on-line working. Any term or word in a PRECIS string can be used as a retrieval key when searching the British Library's on-line files. These retrieval keys can be linked by the usual Boolean operators (AND, OR, NOT). Most workers

Therapy. Glue ear. Children. Medicine 616.28-008.1
Therapy. Mental disorders. Yoruba. Western Nigeria
Divination — *For anthropology* 616.89
Use of herbal remedies — *For anthropology* 615.89
Therapy. Scabies. Medicine 616.995.428
Therapy. Schizophrenia
— *Case histories* 616.895.8
Therapy. Severe burns. Medicine
Skin grafting 617-001.17
Therapy. Snake bite 615.37
Therapy. Suicidal compulsions. Mental disorders
— *Dramatised documentaries* 616.891.7
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Thermal engineering *See* **Heat engineering**
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Second law of thermodyaamics — *Lectures* 536.73
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Screw extrusion 678.027
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Thin foils
Thin aluminium foils. Dislocations. Development 669.71:548
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Three Estates. Lindsay, *Sir* David. Morality plays. Drama in English
Performance in Glasgow by University of Glasgow group 820-291.2
Three-spined stickleBacks
Behaviour 597.53
Thrombocytes *See* **Platelets. Blood**
Thymectomy. Myasthenia gravis. Medicine 617:616.831.8
Thymus
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Thymectomy
Thyroid. Children. Medicine
Hypothyroidism — *Case histories* 616.441-008.64
Ticks. Ectoparasites of cattle. Australia
Cattle ticks. Life cycle & control 636.089
Tides 525.6
Timmins, Philip W. Biology
Theories of learning methods 371.3:574
Tiger beetles
Behaviour 595.76
Tika Tika. Desert regions. Australia
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Aborigines. Camps 39(94 = 1-81)
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Timber. Building materials
Varieties. Identification 674
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Time 115
Dilation. Experiments: decay of cosmic ray muons 530.12
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See also
Knights
Titrimetric analysis *See* **Volumetric analysis**
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Clawed toads. Blastopores. Dorsal lip. Implantation into blastocoeles 578.08:597.81
South African clawed toads. Life cycle 597.81
Toads. *Study example*
Amphibian embryos. Gastrulation & neurulation — *Study examples: Clawed toads — Time-lapse films* 591.3:597.6
Tobias, Stephen Albert
Views on engineering 62.001
Tobruk. North African campaign. World War 2
Siege of Tobruk, *1941 — Compilation films* 940.542.3
Tokophrya lemnarum
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Tongue. Medicine
Physiology 612.78
Role in speech — *For phonetics* 612.78
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Pedestrian precincts. Provision. Community action by hippies 3-053.7
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Town planning 711.4
Toscal electronic calculator. Calculating machines
Operation 518.5
Total mobilisation. Great Britain. World War 2 355.24
Totemic sites. Aborigines. Desert regions. Australia
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Great Britain. Primary schools. Teaching methods 371.3
Town & country planning *See* **Environment planning**
Town planning
— *Study regions: London, Marseilles, Rotterdam, Stockholm & Toronto* 711.4
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Social aspects 711.4
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See also
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See also
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See also
Hunting
Trade
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Foreign trade
Trade. Kula. Papua
— *For anthropology* 38:394(954)
Trade unions
See also
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Trade unions. Bus services. Great Britain
Transport and General Worker's Union. Members. Excursion to seaside resort, *1937* 331.881:656
Trade unions. Great Britain
1880-1945 — Compilation films 331.881(42)
Traditions
See also
Folklore
Traditions. Navaho Indians. Monument Valley. Utah 39(791/2)
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Road traffic
Traffic planning
See also
Road traffic planning
Training
See also
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Figure 2. Sample of index from an issue of *Audiovisual Materials for Higher Education* (London, British Universities Film Council).

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DOCTORS
See also
General practitioners
Paramedics

DOCTORS
Role in team-work in assessment of learning disordered children
Personal view : the team approach in helping children with learning difficulties with particular reference to the doctor's role / N.S. Gordon. — *Child-Care Health Dev.*, Vol.7, no.4 : Jul/Aug 81. — p195-199

DOCUMENT COPYING
See
Reprography

DOCUMENTATION
See also
Indexing
Information retrieval

DOCUMENTATION. Activities. Teachers' centres
Documentation : a teacher center learns about itself / Elan Stevens, Michael Carrino and Wade Scherer. — *Insight (Natl Conf. Teach. Cent. Lead.)*, Vol.4, no.2 : Spring 81. — p43-49

DOCUMENTATION. Games & simulation games. Teaching aids
The **documentation** and presentation of games, simulations and other structured activities / Patricia Cryer. — *Simul./Games Learn.*, Vol.11, no.4 : Winter 81. — p157-161

DOCUMENTATION. Programs. Computer assisted learning
The **need** for more informative descriptions of CAL materials / by J.L. Moore and F.H. Thomas. — *Comput. Educ.*, No.38 : Jun 81. — p11-12

DOCUMENTATION. Programs. Microcomputer systems. Higher education institutions
— *Case studies*
Documentary programs in **BASIC** for the **PET** and other computers / by Ian D. Harrison. — *Comput. Educ.*, No.40 : Feb 82. — p28-30

DOCUMENTATION. Self-assessment. Effectiveness. Schools
Read any good evaluation books recently? / David Oakden. — *J. Natl. Assoc. Insp. Educ. Advis.*, No.14 : Spring 81. — p12-14

DOCUMENTATION SERVICES
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Indexing services

DOCUMENTS
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Leaflets
Prospectuses
Standards

DOCUMENTS. Education
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DOCUMENTS. Great Britain. *Committee on the Recruitment and Training of Teachers and Youth Leaders*
— *Indexes*
Teachers and youth leaders : Sir Arnold's McNair Committee file / John Vaughan. — *Hist. Educ. Soc. Bull.*, No.28 : Autumn 81. — p54-60

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A **survey** of teacher dogmatism in Northern Ireland : open- or closed-minded teaching? / James McKernan. — *Ir. J. Psychol.*, Vol.5, no.1 : Summer 81. — p45-55

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DOMESTIC ANIMALS
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Livestock

DOMESTIC ECONOMY
See
Home economics

DOMESTIC MANAGEMENT
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Household management

DOMESTIC SCIENCE
See
Home economics

DOSAGE
See also
Overdosage

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Figure 3. Page of a one-stage index to *British Education Index* (London, The British Library)

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using on-line systems know that Boolean operators are capable of locating documents where certain combinations of keywords happened to co-occur, but they cannot show how these concepts were related in a grammatical sense. Consequently, if we are searching for documents on 'Attitudes *of* children', and we link together the words 'Attitudes' and 'Children', we must expect to retrieve some irrelevant citations dealing with 'Attitudes *to* children'. Users of the British Library's on-line files can, however, identify these irrelevant items and exclude them from the search before they retrieve citations, simply by asking for a display of PRECIS strings, minus their codes, in the form of fully-precoordinated subject statements. The same facility has been developed by the National Film Board of Canada for its on-line booking system, FORMAT, and the Canadians also intend to make their PRECIS thesaurus available on-line.

These references to users such as the National Film Board of Canada, and also the Deutsche Bibliothek, bring us to some of the more interesting and rewarding developments in PRECIS — that is, its ability to function in more than one language. The National Film Board of Canada produces printed indexes in English and French, and a sample page of one of the French indexes is shown as *Figure 4*. It will be seen that each index entry is followed by one or more film titles (traceable in a title index), not by a class number. At the Deutsche Bibliothek, the researchers in a special project described in Dr Maassen's paper are indexing in German.

Experiments with languages other than English began in the early 1970's, but although the results of these studies appeared to be encouraging, they could hardly be rated as serious investigations. This situation has changed during the past 8 years or so. During that time we have worked closely with indexers in a number of different countries, and have developed a set of specifications for new codes and procedures to deal with the surface features of a variety of natural languages — for example, inflections on nouns in German and the Slavonic languages *(7)*. Many of these procedures have been fully tested and programmed. Taken altogether, these various codes and procedures could be described as an indexing 'macro-grammar', from which

OUVRIERS
Voir aussi
FAMILLES OUVRIÈRES
PROLÉTARIAT
TRAVAILLEURS

OUVRIERS
Conditions de travail. Effets de la mécanisation – *Expériences personnelles*
L'Ouvrier qualifié.
Conditions de travail. Effets de la technologie
Le Défi du devenir.
Prière de ne pas plier.
Une décision capitale.
Conditions de travail: Travail à la chaîne – *Expériences personnelles – Exemples étudiés: Usines d'automobiles*
La Chaîne.
Indiens de l'Amérique du Nord: Mohawks.
Construction des gratte-ciel – *Expériences personnelles*
Charpentier du ciel.

OUVRIERS. Chemins de fer
Nettoyeurs d'aiguillages – *Expériences personnelles*
Paul Toukowicz (Nettoyeur d'aiguillages).

OUVRIERS. Industrie des pâtes et papiers. Québec
Conditions de travail: Travail à la chaîne
Jour après jour.

OUVRIERS. Industrie textile, *1970.* Québec
Conditions de travail
On est au coton.

OUVRIERS. Villes. Chine
Vie quotidienne
Un mois à Woukang.

OUVRIERS AGRICOLES
Voir aussi
BERGERS

OUVRIERS AGRICOLES. Ontario
Récolte du tabac
La feuille qui brise les reins.

OUVRIERS AGRICOLES MEXICAINS
Leamington. Ontario
Récolte des tomates
Le Deal mexicain.

OUVRIERS AGRICOLES MEXICAINS. Mexique
Conditions de travail et luttes politiques
Journaleros.

OUVRIERS AGRICOLES QUÉBÉCOIS. Ontario
Victimes de répression
Les Gars du tabac.

OXYGÈNE
Usage thérapeutique. Mesures de sécurité
Les Jeux de l'amour et de l'oxygène.

PACIFIQUE *(Océan)*
Pieuvres. Exploration sous-marine
Chasse à la pieuvre.

PACIFIQUE (*Océan*). Colombie-Britannique
Recherche scientifique
Pacifique Nord.

PACIFISTES. Société contemporaine
Prologue.

PAIN
Fabrication artisanale par les boulangers
Parole de boulanger.
Fours à pain. Fabrication artisanale
Le Pain d'habitant – 1re partie: Construction du four.
Préparation et cuisson. Techniques artisanales
Le Pain d'habitant – 2e partie: La Cuisson.
Maintien. Rôle des Nations unies
Ouverture.
Points de vue de Pearson, Lester B.
Sous l'arc-en-ciel.

PAPIERS DE LUXE. Saint-Joseph-de-la-Rive. Québec
Fabrication artisanale. Papeterie Saint-Gilles
Papeterie St-Gilles.

PAPILLONS
Voir aussi
CHENILLES

PAPINEAU, LOUIS-JOSEPH. Hommes politiques. Québec
– *Biographies*
Louis-Joseph Papineau (Le Demi-dieu).

PÂQUES. Église chrétienne
La Résurrection.

PÂQUES. Église orthodoxe russe
Rites et cérémonies
Le Christ est ressuscité.

PARADIS, SUZANNE. Poètes québécois
Lecture de poèmes
Suzanne Paradis.

PARALYSÉS CÉRÉBRAUX
– *Expériences personnelles*
Gestes absurdes.
Sur vivre.

PARANOÏA
– *Traitement humoristique – Films de fiction*
La Guérilla, les gars.

PARANORMAL
Voir aussi
OCCULTISME

PARANORMAL
Médiums
Les Chirurgiens médiumniques.
Les Grands Médiums.
Mysticisme et Paranormal.
Photographie paranormale
La Photographie paranormale.
Possession, poltergeist et décorporation
Possession, Poltergeist et Décorporation.
Recherche scientifique
L'Explosion de l'irrationnel.
La science peut-elle expliquer le paranormal?
Réincarnation
Survie et Réincarnation.
Séances
Les morts parlent aux vivants.
Télépathie. Recherche scientifique
Influence de la pensée sur la croissance des plantes.
La Transmission d'images complexes.
Un système de communication par télépathie.
Télépathie et clairvoyance. Recherche scientifique du Rhine, Dr J.B.
L'École de Rhine.
La Transmission télépathique.

PARCOURS DE CONDITIONNEMENT PHYSIQUE
Construction et planification
Parcours de conditionnement.

PARCS NATIONAUX. Alberta
Banff. Castleguard (*montagne*). Cavernes. Exploration
Les Cavernes du Castleguard.

PARCS NATIONAUX. Arctique. Canada
Au-delà du 60e parallèle.

PARCS NATIONAUX. Canada
Cher Jean.
Magie de la nature.
Parcs nationaux.

Figure 4. Sample from page of *Catalogue 1983* (Montreal. Office national du film du Canada)

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the indexers in a particular language community can extract their own local sub-grammar. It is almost inconceivable that a single language community would need access to all the options now available.

One important, and final, point has emerged from these enquiries. The new extensions to the system have been developed to handle what a linguist would call the surface features of language, meaning those mechanisms for expressing relationships which tend to vary from one language or group of languages to another. For example, one language might use prepositions to express relationships between concepts, where another uses postpositions, and a third relies upon inflections. But the basic relationships expressed in these various ways, represented by the role operators listed in *Figure 1*, have not been affected by any of these developments. As far as we can tell, the logic that underlies PRECIS can be applied not only to any kind of document, in any subject field, but also in any language.

References

(1) For an account of the development of PRECIS, see:

Austin, Derek. The development of PRECIS: a theoretical and technical history. *Journal of Documentation*, 30(1), March 1974, p 47-102

(2) British Standards Institution. Guidelines for the establishment and development of monolingual thesauri: BS 5723-1979. London, B.S.I., 1979

(3) International Organization for Standardization. Guidelines for the establishment and development of monolingual thesauri (Draft 2nd edition): DIS 2788. Geneva, I.S.O., 1983

(4) PRECIS procedures are fully described in:

Austin, Derek. PRECIS: a manual of concept analysis and subject indexing. 2nd edition. London, The British Library, Bibliographic Services Division. 1983

(5) A suitable technique for document analysis is described in:

International Organization for Standardization. Methods for examining documents, determining their subjects, and selecting indexing terms. DIS 5963. Geneva, I.S.O., 1981

(6) The PRECIS authority files used in the British Library are reproduced at regular intervals on fiche, and are available from:

Marketing & Support Group
The British Library, Bibliographic Services Division
2 Sheraton Street
London W1V 4BH

(7) Some of these special codes are decribed in:

Sørensen, Jutta. Multilingual aspects of PRECIS. *In* The PRECIS index system: principles, applications and prospects: Proceedings of the International PRECIS Workshop held in the University of Maryland... 1976, *ed* Hans H Wellisch. New York, H W Wilson, 1977

NOTES FOR TRANSLATORS & TYPISTS

1. This paper contains some jargon terms with established equivalents in French and German. The three parts of a PRECIS entry have the names:

English	*German*	*French*
Lead	Leitposition	Vedette
Qualifier	Bestimmposition	Contexte
Display	Darstellposition	Precision

2. Please note that the line spacing and indentation of terms in the typed examples of index entries (pages 5 and 6) should be followed exactly.

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Division: Bibliographic Control

Section: Classification and Subject Cataloguing

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The PRECIS Project of the Deutsche Bibliothek Frankfurt am Main

by

Dr. Bernd MAASSEN

Deutsche Bibliothek

Frankfurt am Main

For internal use only:

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123

Remarks:

to be presented orally ☒

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I. The general background

At the UNESCO seminar "Automatic data processing in libraries" held in Regensburg in 1970, Kaltwasser expressed the view that the use of computers would lead to subject indexes that are substantially different from traditional systematic catalogues and subject heading catalogues.[1] In this context he placed high hopes on the work of a subcommittee on 'Automated subject indexing' founded in 1970 by the Deutsche Forschungsgemeinschaft (German Research Association). In Britain at approximately the same time, PRECIS was introduced into the *British National Bibliography*. With this indexing system, which appeared from the first issues of 1971, part of the work - the generation of entries[2] - was taken over by the computer. Matters did not move significantly in Germany over the next few years. The subcommittee on 'Automated subject indexing' produced an inventory of problems[3] after approximately two years, but no further activities are known. Nor does the West German library scene, outside the Deutsche Bibliothek[4], reveal any impact of a new approach to subject indexing based on computers[5]. PRECIS, on the other hand, had become increasingly well known. During the 1970s, a number of information and documentation agencies in Britain and Canada replaced their indexing systems by PRECIS, and it was also adopted by the national libraries of Australia and South Africa. Pilot projects were also conducted in the United States, France, Sweden and Jamaica (among other countries). Even though PRECIS has not yet been adopted in these four countries[6], the number of such projects clearly reflects the attraction of PRECIS. It is therefore not surprising to find PRECIS described as "without doubt the popular topic in classification and indexing during this period"[7].

PRECIS has attracted a great deal of interest in the Anglo-American countries, but very little in West Germany. For example, the standard reading on PRECIS is still a brief investigation of the system written in 1975[8]. The reasons for this general lack of interest are open to conjecture. One important factor is undoubtedly the language barrier. Even though PRECIS is based on general linguistic principles that are not language-dependent[9], some difficulties nevertheless occur in trying to apply its syntactic rules to the German language. A direct translation of parts of the PRECIS Manual, for example, would certainly not serve this purpose.

The indexing scene in West Germany is, moreover, extremely diverse. An inquiry in 1977 showed that 27 different classification systems were in use in the 50 university, state and regional libraries which possessed systematic catalogues. Only three of these classification systems (Eppelsheimer, the system of the university library Regensburg and the system of the university libraries of Nordrheinwestfalen) were used on a regional rather than local basis. Only one system (the UDC) has any international standing. A further 32 different systems were used in 362 public libraries[10]. This result is still likely to be valid today. In other countries, it seems that libraries are prepared to follow the classification practices found in their national bibliographies, but the advantages of such cooperation count for little in West Germany, where librarians seem disinclined to follow the "dictates" of a central agency.

As far as alphabetical subject indexing is concerned, the scene is less diverse. "Only" 20 new codes of practice for subject heading catalogues have emerged during the past 30 years. This recent trend in West Germany towards verbal indexes rather than classifications is further reflected in the establishment, in 1980, of a Commission for Subject Indexing. This commission was established by the Deutsches Bibliotheksinstitut (German Library Institute), and given the task of developing, within three years, a code of practice for subject heading assignment which should be:

- acceptable on a federal level;
- suitable for computerization;
- equally applicable in all disciplines, and in public as well as academic libraries[12].

This commission, which will finish its work at the end of 1983, consists of three members representing the Bayerischer Bibliotheksverbund (Confederation of Bavarian Libraries), two members representing public libraries, and one member representing the Deutsche Bibliothek.

II. Coordinate indexing and string input indexing

As an initial contribution to the work of the commission, the Deutsche Bibliothek declared its willingness to give up the coordinate indexing system it has used for more than 30 years, and introduce a string

input system from 1986. This early promise was intended to achieve two goals. Firstly, it would ensure that the work of the commission would not be hampered by a commitment, on the part of the Deutsche Bibliothek, to its own present techniques. Secondly, the Deutsche Bibliothek wanted to play a part in a thorough study of this relatively new technique of precoordinate indexing, to ensure that the most useful method could be selected and offered to users. At all costs the library should not be forced, by lack of time, to adopt a method unless its quality had been demonstrated.

A number of different sets of rules for the generation of precoordinate index entries are in common use in West Germany. A study of these reveals that they share the same basic approach with a surprising level of uniformity. Citation orders are predominantly based on formal criteria, which means that the meaning of the string of index terms as a whole, as well as its inner logic, are almost entirely ignored when the string is formulated[13]. This approach forces the indexing agency to establish, in the first place, rules for dealing with individual cases, leading in turn to the need for extra rules to handle exceptions and avoid unsatisfactory strings.

The Deutsche Bibliothek has not yet committed itself to any solution based on this approach. Its existing practice of coordinate indexing - regarded as acceptable for a bibliography which does not cumulate beyond 5 years - allows direct access to any class of headings. To limit access by imposing a priority order would lead to a lowering of the services offered by the Deutsche Bibliothek, especially when such priorities are based mainly on formal criteria which tend to be rather arbitrary as far as subject content is concerned[14].

Starting from this position, the Deutsche Bibliothek had various reasons for studying PRECIS, the indexing method of the British National Bibliography developed by Derek Austin. Since this system is officially recognised by the IFLA project "Universal Bibliographic Control", and a field has been allocated to PRECIS data in the UNIMARC format (field 674), it seemed an obvious choice from the viewpoint of international cooperation. PRECIS is used, with and without computers, by a number of different information and documentation agencies (including national,

academic and public libraries, as well as documentation centres). Since it is obviously based on language-independent principles[15], it seems reasonable to hope that the system could also satisfy the needs of German libraries.

III. Conditions for the PRECIS Project

Working to a very tight schedule, the Commission for Subject Indexing did not have time for a thorough examination of any systems other than the codes of practice currently in common use in Germany. It was therefore decided to base new rules concerning the choice and forms of headings on some of these more or less widely-used codes of practice. The rules suggested by the Bavarian Confederation of Libraries were taken into special account.

It is gratifying to report that, despite these severe time restrictions, the Deutsches Bibliotheksinstitut (German Library Institute) supported a proposal by the Deutsche Bibliothek to set up a pilot project to investigate PRECIS. Funds were granted to support one fulltime position (at postgraduate level) for two years of study (1982 and 1983). In the meantime, the rules developed by the Commission for Subject Indexing had already passed the discussion stage, and it was therefore decided that these new rules concerning the choice and forms of indexing terms should be followed in the PRECIS Project. Two further conditions were imposed upon the project:
(i) the number of operators and codes should be reduced considerably;
(ii) it should be possible for libraries to apply the system manually.
All members of the Commission for Subject Indexing were also appointed as an Advisory Committee for the PRECIS Project. In addition, Derek and Jutta Austin were involved as consultants in training, and they also took part in the meetings of the Advisory Committee.

IV. Special problems encountered by the project team

A. The reduction of operators and codes

The Advisory Committee started from the assumption that the version of PRECIS used by the British Library (among others) is too complicated[16]. This verdict was reached without adequate knowledge of the system, but

appeared to be reasonable from the viewpoint of library politics. Reference has already been made to the diversity of the West German indexing scene; a common system cannot be imposed by decree. This means that there is little chance that West German librarians would accept a completely unfamiliar technique as their common system, regardless of its possibilities.

The Deutsche Bibliothek, in any case, considered that a reduction in the number of operators and codes justified some attention. Such a reduction would allow fewer indexing options, and could therefore lead to less precise indexing, but it was considered that the special layout of the *Deutsche Bibliographie* (German National Bibliography) might make up for this deficiency. In the *British National Bibliography*, PRECIS is offered as a two-stage index, and entries refer to class marks and bibliographic data listed in the classified main sequence. In contrast, the *Deutsche Bibliographie* uses a one-stage approach: titles are printed immediately below each index entry, and direct access is also possible via keywords extracted from titles. It was assumed that this additional information from titles etc. would resolve any problems raised by ambiguous and otherwise inadequate index entries. The results to date from the pilot project appear to confirm this expectation.

After extensive tests and discussions, the following changes have been adopted:

- special techniques for generating entries under selected parts of compound terms were excluded from the system;
- specific operators which can be used to indicate the author's viewpoint and the bibliographic form have been merged: that is to say, operator '6' now carries out an additional task, and doubles for operator '4';
- many of the functions of operator 's' (role definer) are now indicated by operator '2' (action/effect).

Attempts were also made to merge some of the other operators, but recent tests have shown that this is not feasible and would lead to a distortion of the indexing logic.

Reducing the number of operators introduces certain problems. Any system, including PRECIS, can be simplified, but only to a certain point, after which the system would no longer make sense. One of the primary tasks of the PRECIS Project is to ensure that the system is not simplified to such an extent that it loses its ability to generate those natural-language like structures which make it particularly user friendly. Although the limit for simplification is likely to be determined by subjective judgements, we hope to achieve a result that our users will find acceptable.

B. Choice and forms of indexing terms according to the RSWK

The obligation to follow the RSWK (Regeln für den Schlagwortkatalog = Rules for the subject heading catalogue, draft version by the Commission for Subject Indexing, 1982) for choice and forms of terms led to a number of problems, largely due to the fact that the RSWK - like many other indexing systems - consists of an artificial vocabulary, whereas PRECIS uses natural language structures, and attaches importance to the expression of syntactical relationships. A number of rules in the RSWK tend to obscure the grammatical role of a term, and this led inevitably to a conflict with PRECIS. For example, the RSWK rules do not allow the factoring of compound terms, even when they can be analysed into separate components with different syntactical roles.

C. Linguistic features

Although PRECIS was originally developed by Derek Austin for indexing in English, no major difficulties have been encountered in applying the indexing grammar (i.e. the operators and codes) in German. This is mainly due to the fact that the operators express certain roles of terms (such as performer, action, patient of an action, location), which are recognised as deep cases in studies of natural language, and are given the status of linguistic universals. We nevertheless encountered a few language problems. For example, we detected slight differences in the definitions of some grammatical roles in English and German.

V. Criticisms of PRECIS within the Advisory Committee

The Advisory Committee has so far expressed criticism of three features of PRECIS. I shall summarise these in turn, and suggest in each case points that should be borne in mind when assessing the

validity of these observations.

1. *Criticism.*

PRECIS depends very much upon the computer, and was developed as a source of printed page indexes, whereas many libraries in Germany (particularly public libraries) still use manually-produced card catalogues. Even if PRECIS possesses an undisputed qualitative superiority, this would be outweighed by an increase in working time if the system is applied manually. In any case, there would be no room for PRECIS entries (as opposed to traditional subject headings) on their catalogue cards.

Answer.

The Commission for Subject Indexing was charged with the task of producing a code of practice that could be applied to computer-produced indexes. This had to be done within a very tight schedule, since the Confederation of Bavarian Libraries had decided to computerize their subject headings from 1982, and were not prepared to defer this work until the Commission had completed its findings. This is hardly an appropriate point from which to judge whether a new system is suitable for producing traditional card catalogues. PRECIS can, in any case, be used in card catalogues, and its entries take little more space than those constructed by the RSWK. Public libraries need to consider this argument carefully.

2. *Criticism.*

Entries constructed according to the basic logic and syntax of PRECIS will not display all possible permutations of terms. Consequently, some permutations that seem desirable might be missing. The following example was discussed at an Advisory Committee meeting:

Subject: Pollution of the Danube in Austria

String: (1) Austria
(p) Danube
(2) pollution

This produces the following *entries:*

Austria
Danube. Pollution

Danube. Austria
Pollution

Pollution. Danube. Austria

The logic of PRECIS does not, however, permit the entry:

Danube. Pollution
Austria

- which is regarded as desirable by the majority of members in the Advisory Committee. The RSWK, on the other hand, would allow the construction of this entry.

Answer.

It is generally recognised that no system can offer all permutations of indexing terms. One of the undeniable advantages of PRECIS lies in its logico-syntactical rules, since these guarantee a large element of consistency, and hence predictability. This is worth more than the occasional loss of a given entry construction, however desirable. The construction of entries according to general rules could be especially important in a community of agencies that lacks a central decision-making body.

3. *Criticism.*

Indexing with PRECIS is more time-consuming than with the RSWK, and the role operators are too complicated.

Answer.

The inquiry carried out by the Deutsche Bibliothek showed that PRECIS indexing is neither especially difficult nor especially time-consuming. The times quoted were between 15 - 30 minutes per document. Using a simplified version would probably reduce these times even further.

I would like to conclude by turning once again to the UNESCO seminar "Automatic data processing in libraries", held in 1970, where speakers referred to a need to "burst national chains"[17]. This included the area of subject indexing. They pointed towards new approaches to the exchange of data between libraries, national bibliographies and information agencies made possible by the computer[18]. PRECIS, as a computer-based system with multilingual potential, could be a step in this direction.

NOTES

[1] Kaltwasser, F.G.: *Der Nutzen des wiederholbaren Zugriffs zu elektromagnetisch gespeicherten, bibliographischen Informationen* [*The use of iterative access to electromagnetically stored bibliographic data*], in "UNESCO-Seminar Elektronische Datenverarbeitung in Bibliotheken", Regensburg, April 13-18, 1970. [Reproduced in *Libri* 21:1-3 (1971).

[2] The intellectual tasks of subject analysis and choice of indexing terms still remain with the human indexer.

[3] Stolzenburg, J.: *Können grössere wissenschaftliche Bibliotheken den Computer für die eigene Sacherschliessung in absehbarer Zeit ausnutzen?* [*Will bigger academic libraries be able to utilize computers for their subject indexing within the foreseeable future?*], in *ZfBB* XVIII, 1971, 6, pp 373-376.

[4] Concerning the role of the computer in the subject indexing of the Deutsche Bibliothek, see:
Kelm, B.: *Computer aided subject cataloguing in the Deutsche Bibliothek Frankfurt am Main*, Paper, given at IFLA Council 1983, Division: Bibliographic Control, Section: Classification and Subject Cataloguing.

[5] First attempts at a discussion of new approaches can be found in:
Gödert, W.: *Gegenwart und Zukunft der bibliothekarischen Sacherschliessung* [*The present and future of subject indexing in libraries*], in *Libri* 1981, vol. 31, no 1, pp 30-56.

[6] During the months March to May 1982, the Deutsche Bibliothek conducted an inquiry among 22 information and documentation agencies who either use PRECIS or have investigated its potential use. The results of this inquiry show that failure to adopt PRECIS was mostly due to financial and library-political reasons, whereas the quality of the system was praised almost without qualifications.

[7]Craven, T.C.: *Research in Document Classification and Indexing (Canada). 1971-1980*, FID/CR Report No 19, Indeks Verlag, 1981, p 10.

[8]Supper, R.: *PRECIS, ein computerunterstütztes, alphabetisches Indexierungssystem* [*PRECIS, a computer-aided alphabetical indexing system*], in *Nachr Dok* 26 (1975) Nr. 4/5, pp 155-163.
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Detemple, D,: *PRECIS*, in *Bibliothek* 6, 1982, Nr. 1/2, pp 4-46.

[9]See also
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[10]Heinrich, G.: *Klassifikatorische Sacherschliessung in deutschen Bibliotheken* [*Classificatory procedures for improved accessibility of information in German libraries*], in: Kooperation in der Klassifikation, Frankfurt, 1978, pp 33-53 (33).

[11]Heinrich, *loc. cit.* p 39ff.

[12]Heinrich, G.: *Einheitliche Regeln für den Schlagwortkatalog* [*Common rules for the subject heading catalogue*], in *BuB* 33 (1981), Nr. 10, p 851.

[13]The citation order of the *Erlanger Regelwerk* (Erlangen code of practice) (*Regeln für den Schlagwortkatalog* [*Rules for the subject heading catalogue*], 4. Aufl. 1977, p 42ff) is:

1. Names of persons and classes-of-one
2. Ethno-geographical terms
3. Common noun subject headings
4. Time headings
5. Form headings

The *Berliner Regelwerk* (Berlin code of practice)(Unte, *Regeln für den Schlagwortkatalog der Universitätsbibliothek der Freien Universität Berlin* [*Rules for the subject heading catalogue of the Freie Universität Berlin*], 1976, p 16) prescribes the following order:

1. Person
2. Common noun
3. Place
4. Time
5. Form

The *Düsseldorfer Regelwerk* (Düsseldorf code of practice) (*Regeln für den Schlagwortkatalog* [*Rules for the subject heading catalogue*], 2. verb. Aufl. 1975, Düsseldorfer Universitätsbibliothek, p 20) offers the following solution:

1. Name
2. Common noun
3. Space
4. Time
5. Form

The following order was chosen for the *RSWK* (*Regeln für den Schlagwortkatalog* [*Rules for the subject heading catalogue*], Draft February 1982, Deutsches Bibliotheksinstitut, Berlin 1982, p 41):

1. Person heading
2. Common noun and geographical heading
3. Time term
4. Form heading

[14] In these cases, an imaginary user is often quoted, who only searches via this or that term, but he almost invariably serves as an alibi for cherished old habits which nobody wants to change.

[15] See note 9

[16] Junginger, F.: *Schlagwortregeln für wissenschaftliche und öffentliche Bibliotheken* [*Subject heading rules for academic and public libraries*], in *Bibliotheksdienst*, Heft 8, pp 730-747 (736f).

[17] Kaltwasser, *loc. cit.* p 159.

[18] Kaltwasser, *loc. cit.* p 173.

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IFLA GENERAL CONFERENCE MUNICH 1983

Division: **Bibliographic Control**

Section: **Classification and Subject Cataloguing**

49 - CLAS - 2 - E

Computer-aided subject cataloguing at the Deutsche Bibliothek in Frankfurt am Main

by

Barbara KELM
Bibliotheksdirektorin
Deutsche Bibliothek
Frankfurt am Main

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I. Preliminary remark

In 1966 the Deutsche Bibliothek was the first national bibliographic center in the world to install a computer for the purpose of producing a national bibliography. This event had enormous significance not only for the Deutsche Bibliothek, but also for librarianship in the whole world. It was considered pioneer work which offered new possibilities in library cooperation at the national and international levels.[1] From the very beginning this cooperation focussed - as is known - especially on descriptive cataloguing and on the efforts to create a suitable format for the exchange of machine-readable data.

Computer-aided subject cataloguing, on the contrary, has been a hardly noticed event in the world of librarianship until now. Besides this is simply the fact that also the subject parts of the Deutsche Bibliographie especially in the cumulative issues were published more quickly, thanks to the computer-controlled production.[2] The indexing results published in these lists, on the other hand, continued to serve merely conventional retrospective searches.

The computer-controlled production of the Deutsche Bibliographie's subject parts first of all made essentially organizational adjustments in the area of editing procedures. However it also led gradually to further developments in conventional indexing methods. Additional working aids could be made available which again had a positive influence on the quality of the working results. However it was not until the end of the 1970's - that is, more than ten years after the implementation of electronic data processing at the Deutsche Bibliothek - that the subject cataloguing data could be offered and used as central service in addition to the products of the printed bibliography.[3]

The basic subject cataloguing principles of the Deutsche Bibliothek will now be described briefly. An overview comes next of the computer-generated departmental working aids which the Deutsche Bibliothek offers at the same time as central service. The description's emphasis is on Biblio-Data and the support provided by this information database in the indexing work. Finally, an outlook on the development of cooperative subject cataloguing in the Federal Republic of Germany follows.

II. Processing Principles

They apply to German and foreign-language documents which are published within the Federal Republic of Germany, as well as German-language documents published outside the Federal Republic of Germany. The goal is the official announcement in the Deutsche Bibliographie whose broadest cumulations span five years.

Classification of documents is limited to rough systematic divisions for the announcements in the basic lists of the Deutsche Bibliographie. Starting with the 1982 volume of the Wöchentliches Verzeichnis (Weekly List), a subject group arrangement is used which is based on the Universal Decimal Classification (UDC). The order and contents of the 65 subject groups are geared to the UDC.[4]

The emphasis of the indexing lies in the verbal subject cataloguing. This means representing the contents of a document in as few - but most suitable - subject headings (also called "descriptors") as possible. The procedure used here can be designated as "indexing with partly binding, partly free vocabulary".[5] The "binding vocabulary" is drawn from a conventional card catalogue. The latter contains ca. 200.000 standardized subject headings including subject heading see-references from synonyms and quasi-synonyms. Subject headings and references which have not been used for a long while are reused only after terminological control or are replaced by more precise, up-to-date terms. Indexing with "free vocabulary" is possible when a precise subject heading cannot be found in the binding vocabulary of the card catalogue. This is the case, for example, with new terminology in the area of research.

In practice at the Deutsche Bibliothek, specific subject headings mean individual subject headings - as opposed to all other German-language subject cataloguing rules published and to Precis.[6] The Deutsche Bibliothek's method corresponds to "coordinate indexing with descriptors".[7] The subject headings deemed necessary to describe a document are placed next to each other without differentiation of meaning, independent of the context of the document's subject contents. They are simply ordered alphabetically and not, for example, according to a certain ordering procedure of subject heading categories[8] or to syntactical connecting rules.

Further elements identifying contents are added to the individual

subject headings. These are notations and codes which help provide a systematic overview of the subject headings; this applies to the plain subject headings as well as to the ethnographic and geographic subjects and personal names. The classification of subject headings replaces to a certain extent hierarchical references from a more general term. It is helpful not only in the case of systematic literature searches. The synthesis of subject cataloguing and the classification of subject headings have also proven most helpful in the very important terminological and contents-oriented control required in the assignment and application of subject headings.

The goal of the indexing performed is to try to assign always the same content-identifying elements to the same subjects, so that the corresponding documents indexed may also be retrieved when searched for. This may sound trivial. However one can constantly observe in daily practice how difficult it is to follow this basic rule. The standardisation of indexing work is liable to larger difficulties than is that of descriptive cataloguing, so that among documentalists critics of the indexing standard DIN 31623 even argue that intellectual work cannot be standardised.

Standardisation is possible, of course, when constant control is observed. However the increasing flood of literature alone makes controlled processing of newly received documents according to conventional methods ever more time-consuming and inaccurate. There is the increasing danger that terminological control will become increasingly defective and that as a consequence the number of synonyms and inconsistently treated terms will grow.

Thus continuity in subject cataloguing requires continuously referring to previously processed material, as orientation in providing similar subject cataloguing. This working principle is hindered by the expenditure brought about by mechanical searching, so that it can be followed conventionally only in the most urgent cases. Moreover, the recourse to previous subject cataloguing is almost impossible, when an indexer may recall a difficult subject content but may have forgotten important descriptive bibliographic elements. Only knowledge of exact author, title or subject heading can permit finding titles with similar themes in traditional catalogues.
All these reasons made it recommendable to use data processing as an assistance in indexing.

III. Computer-generated working aids and central information services

The following computer-generated working aids are described which facilitate indexing work at the Deutsche Bibliothek or increase its subject cataloguing accuracy and with this its quality.

1. The subject heading reference pool:
   It contains all subject heading references assigned in the subject part of the Deutsche Bibliographie. It is cumulated every six months. It offers as retrieval entry point not only the references which direct to the corresponding subject heading, but also an alphabetical list of subject headings with corresponding references, synonyms and quasi-synonym terms.

   The reference pool serves first of all as internal working tool. The indexers need only flag the references contained in the pool when they are to be used again; the references then appear automatically in the cumulative issues of the Deutsche Bibliographie. One naturally strives to reach a level of automation which makes it possible to generate the synonymous reference automatically when a subject heading is assigned.
   But the pool also facilitates the work for external users. Through the automatic summary of all assigned references to a subject heading, one can identify, for example, the structure and area of use of a subject heading. Moreover, the pool assists in introducing a new subject heading.

2. The subject-heading pool:
   It is rightfully called the "standard list of subject headings of the Deutsche Bibliothek" and forms a subset of the most important working tool, the conventional subject heading catalogue. The newest edition available of the standard list is Volume 1 of the subject part of the Deutsche Bibliographie 1976-1980 which can be ordered separately from the five-year list.[10] It contains, for one thing, the list of standardized subject headings with the indication of the hierarchical search terms - that is the notations and codes. It also contains the systematic list of standardized subject headings. In total it contains currently 50.000 subject headings. Just as the subject heading reference pool, the subject heading pool was also designed at first as an internal working tool - as an

aid in thesaurus work. However, it can also be of great help to the external user, as basis for a standard vocabulary. Through the combination of subject heading and systematic number, it provides exact information on the scope of use until now and in a sense also on the hierarchical placement of a subject heading.[11]

3. Biblio-Data:

The use of machine-readable data in subject cataloguing has reached its preliminary culmination with the on-line access to the information database Biblio-Data. This possibility represents a considerable enrichment of the working aid.[12] Nevertheless this does not mean the automation of indexing. Emphasis of the database's application lies in the considerably simplified analysis of previous indexing results. The goal is to support and standardize subject cataloguing carried out intellectually.

Biblio-Data is actually the largest literature database in the Federal Republic of Germany, with a current inventory of all publications recorded bibliographically since 1966 - year in which data processing began at the Deutsche Bibliothek. There are more than one million cataloguing descriptions of books (including theses, congress reports, etc.) and periodicals (excluding periodical articles). As the national bibliographic data base it covers all areas of knowledge. In Biblio-Data almost all bibliographic elements can be retrieved. Besides the formal bibliographic data, all content-designating data entered are recorded in machine-readable form and are therefore retrievable. They are available for direct access independent of collating rules and category membership, which are so important for conventional catalogues and bibliographies. Biblio-Data can be compared to a dictionary catalogue, but with considerably more access elements. An electronic cataloguing instrument is available via a terminal directly at the place of work, combining into one a large number of traditional types of catalogues and special lists which until now the subject cataloguing department could not use at all or at least not so comfortably. Some examples follow which illustrate the access possibilities.

a. The electronic subject heading catalogue:

Biblio-Data offers in connection with each subject heading a constantly up-dated cumulation of corresponding titles, plus all additional

subject headings and classification symbols assigned to each title. The complete retrospective evaluation of a subject heading's use until a certain point in time is made possible for the purpose of a continuous indexing. By indicating all subject headings assigned to a certain title, the disadvantage of coordinate indexing - with its incomplete informational content in the subject parts of the Deutsche Bibliographie - is simultaneously cancelled.

b. The electronic keyword catalogue:
Keywords can offer the latest terminology, represent the narrowest subject contents only known to an expert and with which the indexer is not yet familiar. For, only in the fewest cases do the reference works at his disposal represent the latest level of research. Nevertheless, a keyword receives hardly any meaning in conventional indexing. It is true that keyword entries have been part of the Deutsche Bibliographie from the very beginning, but keyword retrieval with the help of printed lists represents an inexcusably high degree of lost time.

Not so in the case of direct access to keywords by means of Biblio-Data. The latter makes it possible to use the titles of highly specialized theses in order to clarify terminological problems and thus use the system as decision support when introducing new subject headings. If there appears a topic unknown until now (for example, several times as part of a thesis title), it may point to its being introduced as subject heading.

Access to keywords of documents already indexed can also be helpful: such as when the indexer remembers already having processed contents similar to those which are contained in a document at hand. If in such cases keywords from the document are entered into Biblio-Data as search terms, as a rule several similar titles will appear on the screen. The content-designating data, especially the assigned subject headings, offer a clue as to the orientation to be followed in the binding vocabulary, the subject heading card catalogue or the subject heading pool.

c. The electronic systematic catalogue:
Just as the Deutsche Bibliothek does not have a subject heading catalogue as working tool, so does it not have a systematic catalogue available. Direct access to notations and codes offers a systematic

guideline to information concerning specific subject headings available. The notations and codes allow hierarchical searches on the basis of higher-level relationships: that is, all lower-level terms belonging to a higher-level term are automatically included in the retrieval - without their being explicitly input.

d. The logical linking of bibliographic elements:
The decisive point with Biblio-Data, however, is the computer's ability to carry out mass linkings to an unlimited extent through access to individual elements. The access to classification symbols logically linked to other descriptive and content-designating elements provides retrieval possibilities which far exceed those offered through conventional means, or which could not be furnished at all until now due to the high manual effort involved. The logical linking of several search terms, which on their own are completely unspecific, may lead to such a precise formulation of the search question that titles can be located of which only parts are known.

e. Use of Biblio-Data outside the Deutsche Bibliothek:
In the meantime over 110 institutions at home and abroad, even across the seas, are connected to Biblio-Data. Biblio-Data can be implemented in many ways: to obtain a critical review of available literature, to catalogue (for example, in order to check or identify the bibliographic designated form), in the information service (for example to compile literature). However, whether Biblio-Data is used for subject cataloguing outside the Deutsche Bibliothek is not known. From the users' log-on protocolls, one can only calculate the time needed for retrieval but not the purpose of the retrieval. Unfortunately, the use of Biblio-Data in subject cataloguing is hindered considerably by the numerous changes in the set of rules which are not accompanied by the corresponding linkings in the database, but instead must simply be remembered. For, within the framework of conventional subject cataloguing, a further differentiation of the subject headings' systematic overview could be undertaken with the beginning of each new five-year period of the Deutsche Bibliographie.
Outdated terms could be replaced by newer, more modern ones, for example, due to the advancement of scientific knowledge or of the individual indexer's level of knowledge. The continuously up-dated Biblio-Data-Handbuch[13] attempts to even out these five-year intervals by means of some concordances. In no case it is possible for the Biblio-Data user to later identify which subject heading belongs to which

five-year period for which subject contents. Even the idea persued briefly concerning chronological references - in order to clearly document every change in the subject heading and reference holdings right away for the user - has had to be abandonned for the time being due to technical difficulties.

For the indexers at the Deutsche Bibliothek these uncertainties do not represent any difficulties, however, since - on account of corrections not introduced when mistakes are found later - they are obliged anyhow to check the retrieval results of Biblio-Data in the conventional card catalogue and alphabetical catalogue. For now the time consumed for this is still tolerable. In spite of these uncertainties, the subject cataloguing department at the Deutsche Bibliothek is the leading Biblio-Data user - that is, it has the highest log-on time. Biblio-Data has become an indespensable working tool for subject cataloguing at the Deutsche Bibliothek.
Besides the computerized working aids described here above, the products of the work performed by the Deutsche Bibliothek's subject cataloguing department are offered through further information services, such as, for example, the magnetic tapes of the Deutsche Bibliographie. They already support the subject cataloguing work in other institutions; they are not only used increasingly by others, but are also adopted as outside service.[14]

IV. Possibilities in cooperative subject cataloguing

A last consequence of computerized subject cataloguing would easibly only be cooperative subject cataloguing. One of the prerequisites for this has already been achieved: automated information services make the recorded bibliographic data available - that is, a regular magnetic tape service or on-line access (for example to Biblio-Data) can be put to use.

Thanks to the willingness of libraries to adopt the products of the descriptive cataloguing available on the Deutsche Bibliothek's magnetic tapes, a gradual trend towards also using the Deutsche Bibliothek's subject cataloguing data has inevitably followed. Finally, the establishment of a regional EDP network in the Federal Republic of Germany promotes the acceptance of standardisation also in the area of subject cataloguing while perhaps gradually abandoning the multiple subject cataloguing systems still in existence.

The indexing work at the Deutsche Bibliothek, on the other hand, will have to adapt itself to the necessities of the receiving libraries.[15] At least for the users of these libraries, the advantages of on-line access via terminal will not replace the conventional one-dimensional catalogue in card form or on microfiche for a long time - already simply due to the costs involved.

However, the national sets of rules - such as, the "Regeln für den Schlagwortkatalog (RSWK)" (Rules for the subject heading catalogue) - conflict partly with the international endeavours to standardize bibliographic data. But time and cost reasons make the international exchange of information and the implementation of central services at the international level urgently needed in the subject cataloguing area as well. Standardization in subject cataloguing for the purpose of realising an international exchange of information is thus one of the ideas in the working programme of the IFLA Section on Classification and Subject Cataloguing. One hopes that as working tool for subject cataloguing the computer will continue to exert a positive influence on standardization: towards national as well as international cooperation, in order to master the flood of information. It would be a service to the library user, for whom finally all this effort is expended.

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[5]DIN 31623. Indexierung zur inhaltlichen Erschließung von Dokumenten. Entwurf November 1978.
Part 1. Begriffe. Grundlagen. 5 p.
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[6]Maaßen, Bernd: Ein englisches Indexierungsverfahren für deutsche Bibliotheken? In: DBV-Info 9 (1982). Part 2, pp. 46-69.

[7]compare DIN 31623, Part 1. Sect. 5.2.1.

[8]Regeln für den Schlagwortkatalog. Entwurf. Comp. by the Kommission des DBI für Sacherschließung. Status: Februar 1982. Berlin 1982. 41 p.

[9]Fugmann, Robert: DIN 31623 oder die Problematik des genormten Indexierens. In: International Classification 6 (1979). pp. 109-117.

[10]Deutsche Bibliographie. Fünfjahresverzeichnis 1976-1980. 2nd Part, Vol. 1: Systematische Übersicht der Schlagwörter. Frankfurt am Main 1982.

[11]That a general thesaurus can be established on the basis of the standard subject heading list and of the subject card catalogue was the positive result provided by Dahlberg, Ingetraut: Die Pilotstudie DB-Thesaurus. Eggenstein-Leopoldhafen 1980. 74 p.

[12]Weidemüller, Hans Ullrich: Biblio-Data in der Sacherschließung der Deutschen Bibliothek. In: Biblio-Data, die nationalbibliographische Datenbank der Deutschen Bibliothek. Eggenstein-Leopoldshafen 1979. pp. 69-105.

[13]Biblio-Data-Handbuch. Comp.: Reinhard Buchbinder. Frankfurt. Loose-leaf ed. Main vol. 1980.

[14]Since 1978 a subject heading index based on the Deutsche Bibliothek's subject headings is published, for example, along with the "Verzeichnis lieferbarer Bücher" (List of available books) of the Buchhändler-Vereinigung.

[15]compare 6.

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Division: Bibliographic Control

Section: Cataloguing

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Waiting for technology : an overview of bibliographic services in the Third World

by

Dorothy Anderson

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1 Introducing information technology

We have all become very aware of the rapid developments in high technology which are taking place, particularly those in information technology, 'informatics', by which is meant the 'various means of obtaining and transferring information using computers, telecommunications, and microelectronics'.(1) More recently, the consequences of that high technology in the transfer of information to and from developing countries have been the subject of much concern nationally and internationally. Conferences, seminars, tasks groups, 'think tanks', sponsored by the United Nations and by a variety of other intergovernmental and international organizations have examined in much detail what appears to be happening: that, far from shrinking, the gap between developed and developing countries is growing wider.(2)

These organizations in their deliberations and at their meetings have assessed the problems realistically and to a very large extent have pronounced the same solutions. All have agreed that the gap must not be allowed to widen further, and that Third World countries must take an increasingly active role in communications development. If they do not, they will fall further behind in the search for information which can be used to develop national resources, assist in the building of national infrastructures, establish national administrative efficiency. If they do not, there is the danger that already part of the 'information poor' they will become further drained because their sources of national information will be recorded by outside organizations which will then be in a position to sell that information.

All the experts have also agreed that Third World countries should include as part of their overall plan for national development a strategy for the introduction of information technology.(3)

It has also been recognized by all the experts and at all the meetings that there are formidable obstacles to the introduction of high technology in Third World countries; and that in some countries the introduction of 'low technology' (defined as equipment and machines such as the typewriter, the offset printing machine, the copying machine, the battery-operated cassette player, the microform reader) can be difficult, and considered an achievement.

It is worth emphasising that difficulties in introducing technology can exist not only in Third World countries but in every country among institutions and administration where there are distinctions in resources and size. Most of the recent advances in information technology have been developed in response to the needs of large organizations in industrialized societies, and their economic and efficient application relates to large scale operations. The 'information rich' and the

'information poor' can operate side by side in every country; for example, between larger and smaller industries, national and local enterprises, the city based operation and that of the rural community.

For most Third World countries the major obstacles to the introduction to information technology are first and foremost the lack of resources of money and manpower. Then there are the weaknesses in communications and transport, poor telephone and postal services, inadequate roads and rail services. Because the electricity supplies may be less than reliable, computer installations may require the installation of additional emergency power supplies, hence doubling the cost. Limited financial resources may be compounded by governmental restrictions on the export of currency; or on the import of machinery to include spare parts. There is the lack of trained personnel to instal, run, and maintain that machinery and, therefore, there may be the necessity to depend on expensive imported experts. The result may be a long term dependence on the outside world to support an information system which may become outmoded requiring the purchase of new machinery and a new system which will require more outside experts.

In Third World countries there are other problems which are not so immediately apparent in considering information technology and transfer. The imported machinery may have been developed in a country using a language and script which is foreign to the country: hence the use of the new technology will be limited to a small educated elite. Indeed, the country as a whole may be unaware of the importance of information as a national resource. In any case, information resources within the country may be inadequate in extent and in language to support further use which would arise from establishing links with the larger international community of data bases and information systems. Finally, there may be the cultural shock of trying to introduce the rigid inflexible discipline of computer technology into a society where the attributes of detail, accuracy and mathematical precision have not formerly been required.

Even so, in spite of all the problems noted above, or any particular assortment of those and of others, the number of computer installations in Third World countries is increasing: in areas of government planning, for use in matters arising from national security, in government statistical, accounting and administrative procedures, in research institutes, in banks and finance houses, in market research. Even, in some instances, in libraries.

2 Libraries and information technology

It is noticeable, and rather odd, that in all the discussions on the advantages and disadvantages of introducing information technology into Third World countries, libraries are rarely mentioned. Data bases, yes, and information systems in relating information transfer to facts, figures, and references; but information and information transfer rarely appear to be considered as related to books, and there seems to have been no overall consideration of the ways in which the automation of library processes could assist Third World countries reduce that gap and move from the 'information poor' to the 'information not so poor'. Yet the criteria noted above for the introduction and implementation of information technology within a country stands also for its introduction into library processes, with a number of additional factors to be considered.

First, however, should come the recognition that every aspect of bibliographic recording and the manipulation of bibliographic records, whether those records are prepared in machine readable form or manually, requires discipline, a mental alertness, an understanding of intellectual complexities of authorship and related intellectual tasks. There is also the fact that the world of publications, of books and serials, is far from static, is ever changing in design, in physical layout, in the relationship between the product, the publication, and its originator, the author.

On the other hand, just because of those complexities and inconsistencies, there are a large number of bibliographic processes and library maintenance operations, which require constant attention, concentration of detail, tasks which when undertaken manually are long drawn out and boring, and which would seem to benefit particularly from the use of a machine to undertake those operations speedily and accurately. In addition to the preparation of records in machine readable form, hence facilitating their manipulation in many forms and their transfer to other systems, there is the possibility of using the computer to take over the maintenance of large files, to update sequences, to link related records, and to recognize and distinguish variations of names and titles. The benefits are immediately apparent, but, as librarians have discovered, it is more difficult and more demanding intellectually to design computer programs for bibliographic matters than it is for statistical data or for worldwide air line bookings. There is the additional factor that library development is rarely considered a high priority in any country's overall development plan, and libraries are more often than not considered deserving only low scale funding because they are seen as a long term investment.

It is not surprising, therefore, that there have been many experiments over a relatively long period in the use of information technology in libraries, with many plans which have not developed coherently, or which have been abandoned because of escalation in costing, or which have proved to be too long drawn out in the development stage with little prospects of ever becoming operational. There is also the fact that many national plans have been designed looking at national needs of language and of publications and have been based on national practices in bibliographic recording, with consequent further delays when trying to fit a national system of machine readable (MARC) records into an international network for the exchange of those records. There has been the ready acceptance that the computer and its products work best when based on standards, preferably international standards. Notwithstanding, the international network of libraries and national bibliographic agencies exchanging MARC records has not developed as swiftly as originally envisaged, partly because of difficulties and delays in converting from national MARC formats to an accepted international exchange format.

Under these circumstances the soundest advice to librarians in Third World countries contemplating the introduction of computer systems for bibliographic processes could well be, wait and see, make use of the experience and experiments of others. This attitude was summed up at a seminar in Nigeria in 1974:

> 'Nigeria's dependence on publications from abroad, and the need for overseas publicity for local publications make it imperative for the librarians of the country to take an active interest in new developments such as MARC, as a means of facilitating national and international bibliographic exchange. The seminar expressed the view that, in spite of the enormity of the task, a start should be made and standardization of cataloguing was the first step.' (4)

Now, nine years later, librarians in many Third World countries would say that they can no longer afford to wait. On the one hand, there is the concern that systems designed in Europe and North America may not be suited to their languages and their national publications. On the other hand, in many countries a very high proportion of the book stock in libraries will be publications produced outside the country (as noted at the Nigerian seminar), and there should be bibliographic records for those publications produced in the countries of origin and available as printed entries in issues of a national bibliography or as catalogue cards or as machine readable records. There must be advantages for any library which can link its purchase of overseas publications with the purchase of existing records for those publications, whether as catalogue cards or MARC records. For many libraries in Third World countries the initial introduction to computer systems has been through the acquiring of MARC records for book purchases: the National Library of Singapore, for example, is in the process of automating its catalogue by using British Library BLAISE and its Selective Record Service.

There will be even more advantages when, as part of developing a national information programme, an integrated library system can be planned for the whole country whereby the national library and other specialized libraries can not only receive MARC records but can also contribute machine readable records for national information sources, including books, serials, research reports, journal articles, to existing international information systems, such as AGRIS, ISDS, and the MARC network of national bibliographic agencies.

3 National information programmes and library development

In some Third World countries assessment of a strategy for the introduction overall of information technology has already been extended to library development and to applications of bibliographic services. It is interesting to note that notwithstanding very different cultural and economic environments, as well as variations in size and resources, there is a similarity in recognizing problems and in proposing solutions.

In Saudi Arabia and the Gulf States there is no lack of financial resources and computerized library systems are already in operation. The problems in library development are seen as such that cannot be immediately identified and solved by high technology. They are the same basic problems that exist in many Third World countries: the lack of library standards, of library legislation, of library planning at the national level, of professional education within the countries, with a shortage of librarians and a lack of an active professional library association; in addition, there is the need for many more publications in Arabic, particularly for children, with the introduction of library courses in schools and training for teachers in using library materials.(5)

In Singapore there is a tradition of interaction between an active professional library association with government bodies, with publishers and booksellers, and it is in keeping with this tradition that a committee has been set up to examine Singapore's information needs for the coming decade and determine how best to set up a national information system suited to those needs. Priorities established include the strengthening of existing library collections into comprehensive national collections in specific subject areas, and in support of such a programme, the development of a computerized national union catalogue linking the national collections.(6)

Planning for a national information programme in Malaysia has highlighted existing weaknesses in relation to particular needs. A major aim has been expressed emphatically:

> 'It is imperative for Malaysia to achieve comprehensive documentation of all Malaysian material, in the form of bibliographies and indexing and abstracting services, locally and abroad...'

and in order to achieve this, it is necessary to make use of information technology, which 'appears to be well within the economic and technological capabilities of Malaysia'. Specifically, the national information programme should aim to incorporate into the national information infrastructure the acquisition of external data bases in specific subject areas; the establishment of national data bases on specific subjects of national importance; and the incorporation into relevant external data bases of all published information originating in Malaysia.(7)

At the regional level, plans for an information centre for the South Pacific - to be called the Pacific Information Centre - are under discussion, with the major objective to 'be primarily concerned with the collecting, recording and disseminating of published and unpublished materials originating in the region and/or relating thereto'. In planning the Centre, 'computerisation is being approached cautiously mindful of the regional nature of the project; rather on a wait and see basis...' At the same time, specific parts of the work of the Centre, such as the register of research projects and the union list of periodicals, will be developed in anticipation of using the computer very shortly, with the possibility of searches in external data bases.(8)

The consultant's report on the proposed plan for an integrated library and information service in Barbados (to be known as BLAIN, Barbados Library Archive and Information Centre Network) pointed to some of the strengths in the existing library structure, including 'a very good cadre of professional librarians' and 'a very strong tendency to improve existing activities by indigenous means and to seek foreign assistance, principally for advice and as a resource to hasten development.' On the question of the timing and manner in which computerized services would be introduced, the consultant pointed out:

> 'The relatively small size of the [Barbados operation] and the scarcity of trained personnel make it mandatory that all such activities should be applicable to the system as a whole and no network node should be permitted to "do its own thing". The need to cooperate not only nationally but also regionally and internationally put added emphasis on this point.' (9)

There will be the selective introduction of computer assisted schemes, starting with projects such as the union list of serials and a data bank of research reports.

It should be noted that Barbados has other advantages as well as those noted in the consultant's report: it is small, compact, and English-speaking, hence with the possibility of linking the more easily with data bases and information services developed in the USA and UK.

Not all Third World countries have the advantages or the possibilities of the countries described above when it comes to planning national information programmes and looking to introduce computerized services as one way of becoming part of the developing international communications system. But most Third World countries, whatever their size and stage of development, now recognize the need for such a national information programme, although in some instances querying whether a practical and economic plan to implement the programme can ever be found. A description of the situation in Papua New Guinea sums up what are the long term problems for many Third World countries:

> 'Papua New Guinea is not isolating itself from the developed world as a basic principle. The government appears to have made a decision to protect and encourage its many cultures while at the same time developing into a self sufficient nation organised, at least on the surface, in the same manner as most developed countries ... This approach implies competing on equal terms with developed countries which in turn means that financial, trade and demographic information is required quickly and accurately, and that the internal systems of government need to function reasonably efficiently. It is generally accepted that these requirements are best met by using computers systems. The question then becomes how to limit the scope of computerisation to fit the people and hardware resources available or how to best expand these resources.'(10)

In terms of library development, in trying to keep this balance between national culture and the outside world, there can be some very special problems. In Sri Lanka, for example, a country with a high literacy rate and a great interest in reading but a language and script not used worldwide, there are problems in trying to obtain resources to develop a character set for the Sinhalese script; in order to make use of existing computer facilities, the question has been posed as to whether the national bibliographic agency should transliterate all Sinhalese and Tamil records into the roman script - a solution which must be regarded as nationally unacceptable.

This experience highlights other problems. There can be much frustration and organizational stress when automation is brought in not because it is the next stage in the library development plan but because there is available capacity in the computer installed in a government ministry or university institute. Something of the same frustrations arise when national plans for automation have received support from organizations outside of the country with offers of equipment or software packages, offers that are generous and difficult not to accept, but where the systems are not compatible with existing library cataloguing practices; with the prospects that using them will fragment rather than assist the development of an integrated national system.

4 Priorities in library development

Each country, in planning a national information programme, has to make an assessment of its priorities in library development and thereafter, in relation to resources and needs, determine priorities for the computerization of which or of any bibliographic services. First priority for every Third World country however limited its resources must be to ensure that its sources of national information are recorded within the country and are made available to the larger international library community - in effect, to make sure of its own national bibliographic control. It is true that the functions of maintaining bibliographic control do not necessarily require high technology; there are, for example, Third World countries currently producing printed national bibliographies to the accepted international bibliographic standards using only a typewriter and a duplicating machine, with at the same time their librarians undertaking a variety of other bibliographic tasks.(11) It is also true that many of the functions of control, and of availability, are made easier when high technology is available; the example that comes to mind most readily is that of maintaining union catalogues. The order of other priorities in library development may depend on the overall national development plan, and may relate to a choice between providing sophisticated information and bibliographic services to an informed elite or communal and general educational and library services for ordinary readers.

To some extent we are creating two different kinds of libraries addressed at these two different kinds of potential readers. On the one hand, there is the growing vision of the library as a machine: a storage system for handling the information requirements of an extended industrial world, with librarians playing the part of managers of information services. Contrasting is the development of the library as part of a community and cultural centre, where the book collection is extended by a range of other materials and other services, tailored to meet the needs of each community.(12)

The profiles of these two kinds of libraries may be very different - their services to readers, the readers themselves, and their book collections - but those collections will be organized basically in the same way in order to exploit the collections in the interests of the readers. Up till now library catalogues, whether the entries are short or complex or handwritten or typed on cards or available on tape or on line, have had the same basic design reflecting the principles discussed more than twenty years ago at the Paris International Conference on Cataloguing Principles. There has been - a point emphasised in a number of library development plans - the possibility of moving from a card catalogue to an automated system when resources are available. But the new information technology brings with it the possibility of new catalogue design. Fred Kilgour is one writer anticipating the future:

'Until the advent of the computer, available technology did not offer any potential that would significantly affect arrangement of entries and format; flexibility of arrangement and of format; and availability... the potential of making possible entirely new designs both in form and content... Prior to the new catalog designs made possible by computerization, all library catalogs could be viewed as a linear arrangement of entities...(13)

The prospects here are daunting for our concept of one world of libraries and librarianship. The UBC programme, for example, has been based on the principle that each country has both the experience and technical knowledge to describe its own publications and identify and handle problems arising from its own peculiarities of bibliographic control. But if, through the use of high technology, bibliographic information is recorded in some countries in a different structural form from the way it is recorded in other countries, when there is no possibility of an interface between the traditional linear catalogue - the card catalogue in manual form - and the computerized catalogue, then we will have two totally different kinds of libraries and the gap between the 'information rich' (in knowledge and equipment) and the 'information poor' will have further widened.

For library users in Third World countries there can be two extremes of frustration. On the one hand, there is that member of the elite, the research worker who has made use of an international data base in a specialized field, identified ten relevant references, but cannot find any one of the books or journals (or there may be copies in the country but there are no means to find out what is available). There is, of course, the solution offered by the experts in setting up an online information retrieval service in Morocco:

'After receiving the listing of references, the primary papers will be ordered from the French CNRS or the British Library at Boston Spa.'(14)

But however efficient the CNRS or BLLD organizations, such a service is still dependent on postal deliveries; in any case, can it be considered the most appropriate long term solution for any Third World country?

At the other extreme of frustration are the new readers proud of their new skill who can find nothing of interest in their own languages on the shelves of their local library or in the book boxes delivered at their schools. Librarians in Third World countries can well consider that they have additional functions to carry out, to ensure the actual existence of reading materials that will be of interest to potential readers. A further priority is already apparent: book development programmes must go hand in hand with library planning.

This seems even more important in countries where the traditions of reading and writing and publishing are new, as in Papua New Guinea:

'If the library service for the entire population is a social responsibility which every country must accept, then libraries certainly have a role to play here in the development of national and regional languages.'(15)

For Third World countries, therefore, library planning can imply maintaining a balance with limited resources between these two demands. On the one hand, the accepted requirement that every Third World country must involve itself and its professional manpower in introducing and supporting the new information technology. On the other hand, there is the equal need to promote libraries and build up library collections as part of an extended educational system. Two not altogether compatible aims, which in turn can create conflicting demands in the training of the personnel to maintain the differing roles.

5 Looking to the future

Within the profession of librarianship there has been a long standing tradition of communication and transfer - between organizations and of people through visits, workshops, exchange arrangements, with a sharing of experience and training. It is very certain that larger libraries and national bibliographic agencies in more developed countries can give an impetus to library development in Third World countries by continuing such arrangements of goodwill and hospitality. Librarians in those larger libraries can also give support in other ways: first, there has to be recognition that information technology and sophisticated catalogue design are not going to be possible or practical for a long time in many libraries in both developed and developing world, and the acceptance of continuing bibliographic services that will support manual systems. The services which come readily to mind are the continuation of the larger national bibliographies as printed issues and of card services. The British Library, for example, in noting that its card service has dropped in number from an annual distribution of five million to three quarters of a million, recognizes that this is a service required in both smaller libraries and overseas libraries.(16)

In designing and developing computer formats for bibliographic services with all the associated software, manuals, maintenance routines, etc., larger libraries and national bibliographic agencies can assist further by keeping in mind the practical possibilities of international exchange and looking to develop formats that will be hospitable to international, rather than national, practices. As an example there is at the moment the commitment among the larger national libraries and bibliographic agencies to use UNIMARC, the international exchange format

developed by IFLA, with the production of the necessary conversion programs, software and maintenance. Library of Congress is preparing conversion programs from UNIMARC to and from LC/MARC and is making these formats readily available for the cost of duplicating and postage. At another level the larger libraries, in looking ahead to the exchange of machine readable records in greater and lesser quantities from an expanding network of countries, should ensure that as few as possible restrictions are imposed on the actual processes of exchange.

Intergovernmental and non-governmental international organizations have already offered much and have much more to offer to library development in Third World countries. Unesco, within its General Information Programme, is committed to assisting Third World countries build up their own data bases, and hence is considering the possibility of supplying both micro computers and software packages. Unesco PGI has provided considerable support for the development of standards for bibliographic recording and the exchange of records through organizations such as IFLA and ISO and directly through the publication of Unesco guidelines and manuals. It initiated the preparation of a Common Communication Format which is compatible with both UNIMARC and the *UNISIST Reference Manual* and which will serve as an exchange format, a bridge between the requirements and practices of various sectors of the international information community, and as a framework for an exchange and processing format for new systems which may be developed in Third World countries. Unesco has also given support and funding for a number of individual schemes in Third World countries; as one example, in Malaysia the development of MALMARC and a computerized serial union catalogue project involving the National Library and five university libraries.

The International Development Research Centre (IDRC) has also been active in supporting regional projects in South East Asia including the Consortium of National Libraries and Documentation Centres.(17) The IDRC software MINISIS package for developing an acquisition-cataloguing-information retrieval system has been made available to libraries and documentation centres in Third World countries, and its potential for promoting integrated systems will be further advanced when, following the initiative of IFLA in consultation with IDRC, MINISIS is modified to make it compatible with UNIMARC and the CCF and able to produce MARC-like records in accordance with AACR2.(18) The Organization of American States, with a long tradition of supporting library developments in Latin America, has promoted a number of cooperative cataloguing systems, and has sponsored the development of MARCAL, the Spanish version of MARC.

It is anticipated that these organizations and other aid funding bodies will continue to give support in accordance with the requirements and requests of Third World countries - whether it be in promoting courses for editors and publishers using typewriters and duplicating machines (as the Commonwealth Secretariat has done in the Solomon Islands) or in arranging for extensive university training in computer science for limited personnel on exchange (as was requested by Brazil and provided by the Canadian International Development Agency). The choice of when and how information technology comes to a Third World country must surely be the decision of that country - in the hope that if and when a request is made, funding organizations will be sympathetic and generous.

There is still much to be done in developing the further required international standards for the easy exchange of records and the proper steady growth of the international information system. There is the need, for example, both for more internationally acceptable transliteration schemes and for the development of character sets for many more Asian scripts. We cannot continue to envisage a future where the roman script dominates the data bases and online systems. We should be able to postulate a future where the national bibliographic agencies of the major European countries produce current national bibliographies which truly reflect the literature of those countries, with records of their national publications appearing in roman, arabic, cyrillic, chinese, urdu scripts, and with those records available in machine readable form or as printed issues of the national bibliographies or as catalogue cards, all the product of the computer.

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See also Reference 6.

IFLA GENERAL CONFERENCE MUNICH 1983

Division: Bibliographic Control

Section: Cataloguing

13-CAT-2-E

Problems in the Cataloguing of the products of rapidly changing technologies : with Special Reference to Machine-Readable Files

by

Lenore Coral

Music Librarian

Cornell University

Ithaca, N.Y.

U.S.A.

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The development of the International Standard Bibliographic Description formula grew out of the discussions at the Paris International Conference on Cataloguing Principles (1961) and the International Meeting of Cataloguing Experts in Copenhagen in 1969.

One of the principles agreed to in the 1969 working meeting was that the International Standard for Descriptive Content as it was then called "should be designed to accommodate all the descriptive data commonly required."[1] An analysis of eight national bibliographies had been undertaken by Michael Gorman to determine what these requirements might be. The material which I am going to discuss here today could not have played a role in the choices that were made. Machine-readable data files were quite new and they were certainly not contained in any national bibliographies.

None the less, concerns about cataloguing standards for this material are not new concerns. Literature about cataloguing machine-readable files dates back to the early 1970's. Most of the work towards producing cataloguing rules for machine-readable files done thus far has concerned achieving bibliographic control over large machine-readable files. These tools and products of the social sciences are the modern day means for communicating and manipulating large bodies of statistical data. Most of these files are the products of governments and of various research institutes. Many of them can be purchased from their producers or from distributor intermediaries.

The rules developed for cataloguing these materials have been most fully codified in Sue Dodd's Cataloging Machine-Readable Data Files published last winter.[2]

The questions I wish to raise here are whether these materials are best described following the model set by printed materials and canonized in the International Standard Bibliographic Description program of the Office for Universal Bibliographic Control of IFLA. Or whether because of their nature and their modes of use we had better re-examine the standards that we should apply to their description.

For my analysis I am going to go area by area through the model ISBD(G) and discuss those points about which questions have been raised. In many instances I will raise issues without resolving them. Among the caveats we must bear in mind is that the materials we are considering are those available today. They are not the products of a static or stabilized industry. They are machine dependent. In some instances the development of a new machine means that something will have to be changed in the items associated with the previous machine if these items are to continue to be usable. In this process the physical form of the item may be changed, but not the work it contains.

Those of you concerned with the more normal domaine of the librarian may recognize that this can happen to a book as well -- it can for example become a microfilm and the text remains the same. I would agree -- and suggest that this is perhaps why some of the larger libraries faced with handling large quantities of microfilm surrogates of books, those normally made for preservation purpose, are so uncomfortable with the application of cataloguing codes made for this material which are based on the ISBDs.

So as not to get sidetracked however, let us return to the products of modern technology which I think particularly require out attention here.

The most volatile technology and the technology which is predicted to

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have the most far reaching impact on our future includes the programs and data files associated with computers of all sizes.. Because computers themselves are constantly undergoing modifications, programs and data files associated with those computers must also undergo modifications which will allow them to function on the changed machine and better yet to take advantage of the improvements which have been made to it.

Computer files are not viable without the associated machine -- but the material which libraries wish to control "bibliographically" is the files. The user wants to know if the library has particular machine-readable data file or program? It is a presumption that ownership implies the equipment required to attain access to the encoded information or operation. Although it is unlikely that most of this material will ever be taken outside the holding institution, programs for microcomputers are being purchased and circulated for home use by public libraries in the United States.

To begin our examination of the areas of th ISBD:

AREA 1: I think that the aspects of this area which are the most problematic are what should constitute the prescribed source of information particularly for the title statement and what constitutes responsibility for these materials? Before I expand on these two large topics there is one brief point I should like to make. So far in the first edition of ISBD(NBM) and in Anglo-American cataloguing practice the General Material Designator for the computer materials has been "machine-readable data file." Indeed the first materials resulting from this technology which presented themselves for cataloguing were data files such as census results. Today however libraries are acquiring a wealth of products including software or program files, and object files as well as data files and machine games. It would seem more appropriate therefore to choose the more encompassing term "machine-readable file" as the GMD.

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All of these materials share one characteristic. They lack a single identifiable equivalent of the title page in a book. The original authors of ISBD(NBM) have wisely chosen to provide cataloguers with multiple options from which the fullest information for any area of the description could be drawn. However this lack of a single source or hierarchy of sources allows for the possibility of greater variation in the transcription of bibliographic data than will be found in the cataloguing of books. The different sources of information may bear different titles, and the one chosen by the cataloguer may not be one permanently associated with the item being described. For machine-readable files the only title may appear on the documentation accompanying the file. This can lead to serious confusion in the situation where the documentation or the file changes but not the two together.

Some people have advocated that all machine-readable files should be provided with internal user labels. These would serve as the preferred source of information. So far there are two distinct problems with such a labeling system. The first is that there appears to be reluctance on the part of producers of such files to automatically include such labels. This may stem in part from the fact that such labels may require special programming to enable them to be read. And they may add another level of complication when it becomes necessary to convert the file for use on a different computer.

The matter of who bears responsibility for the work is an extremely complicated one. For machine-readable files we can observe a variety of kinds of responsibility. For program files we have the author of the program or the programmer. For data files we have a much more complicated series of people including the designer of the project; the collector(s) of the data; various levels of encoders, analysts and so on. The author of the manual describing the file may or may not be any of the above.

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The question is which of these categories of participants in the creation of the work appropriately belong in the statement of responsibility and which are best relegated to the notes.

Probably the most difficult problem presented by these products of technology is the definition of what should constitute an edition. This term has been redefined as a part of the current ISBD review as: "All copies of an item produced from substantially the same original input and issued by a particular publishing agency."

The fluidity of machine-readable data files and the ease with which they may be manipulated makes it particularly difficult to define the way in which the very bookish concept of edition can or should be applied to them.

Clearly the user needs to be told when the content of the file has been altered. Most statements about machine-readable data files allow for minor alterations and corrections to the file without considering them new editions. A precise definition of what constitutes a new edition of a file has not yet been devised.

It has been proposed that since machine-readable files are so mutable their format should not be a criterion for defining edition. The ALA Subcommittee on Rules for Cataloging Machine-Readable Data Files suggested that, "an edition statement should be based on the presence of an edition statement in the MRDF or its documentation, a difference in the content of the file, a difference in the count or size of the logical records, or the naming of a different editor or compiler."[3] Differences in the program language for data files or in the text input for text files also indicate another edition.

Since so far most of the machine-readable files for mainframe computers have not been distributed in a traditional commercial way but are produced

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on demand much like micro-facsimile copies of books, the date of distribution is not an important criterion in determining whether one has a new edition. Many of the programs and data files associated with micro-computers are already distributed in a more conventionally commercial way. Documentation accompanying these files is more likely to bear edition statements similar to those we associate with other published materials.

The physical description of machine-readable files is complex. I have already spoken of the volatile nature of the computer data file. For this reason it has been recommended that these files be described by characteristics which are not subject to change, that is by something other than their physical characteristics.

The ALA Subcommittee recommended that physical details be omitted in favor of a description of the intellectual content of the file. The suggestion in Sue Dodd's recent manual is that for data files the specific material designator be"data file" and that this be followed by the number of logical records. While in general the authors of the first edition of ISBD(NBM) described in Area 5 the physical form of the items that they were providing stipulations for, they accepted the advice of the machine-readable data file community and described these files in terms of the number of logical records.

Inspite of the fact that thus far logical records have consistently been the method utilized for describing this material this method of description is not accepted enthusiastically by all of the people handling these data packages and it presents some real problems as the method for describing more recently marketed forms of machine-readable files.

The first problem has to do with the definition of the term logical record. A logical record is a unit of no fixed length -- thus identifying the number

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of logical records will in no case give a user a sense of the physical size of a file. What it may tell the person is information about such questions as the number of people polled or the number of categories of information stored in a data file. The number of logical records in a file has usually to be ascertained from the accompanying documentation if it can be ascertained at all. For example this is usually not a determinable, nor useful concept, for measuring data in text files. Computer files which are programs are never measured in terms of logical records. Source programs can be measured in terms of "program statements," object programs cannot be measured by either of these factors.

The question I should like to pose here is what does the user need to know about the extent of the item he seeks. And what does the librarian need to know about the physical extent in order to care for and provide access to this material?

With the appearance of micro-computers whose files are computer specific and thus less volatile than the files for mainframe computers we can observe several different factors coming into play. First, librarians msut know in their record keeping function how many items they have circulated. Thus a micro-computer program on 5 floppy disks ought, it seems to me, to be described as such.

The physical description of machine-readable files based on numbers of programs carried or numbers of logical records contained is a bit like describing sound recordings in terms of the number of concertos on the disc or books by the number of chapters they contain. These are interesting and even useful pieces of information but they tell us very little about the physical extent of the item we seek.

The physical description area has always been used to indicate the

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characteristics which must be known to allow an item to be used. Thus description of the machine language or kind of machine required for machine-specific files would seem to be an important piece of information. In addition to this one needs to know if one requires any particular software or firmware to utilize a particular file. And we must determine how we are to describe physical extent.

Is there one way of describing all of the kinds of files in machine-readable form? Or must we have different kinds of descriptions for different kinds of files? This would be a departure from traditional cataloguing practice because it would mean that physical description was based on content rather than form.

I believe that many of the questions I have posed here return us to the philosophical position of a generation ago -- are we cataloguing a work or its physical manifestation? The ISBD program has opted for the latter choice.

Can this position be applied to all materials now held by libraries? Are rules for cataloguing machine-readable files passing through the same series of steps which rules for books and other materials took several decades ago? And will in the end cataloguers catalogue the particular manifestation rather than the work?

Many of the points I have made about machine-readable files could be applied equally well to other volatile technologies: sound recordings, video recordings, holograms and optical laser discs all present us with the possibility of readily transforming one medium into another. If libraries of the future are to share this magnificent ability with their patrons then we must recognize that all media are only means to transmit the message — and that the work itself is what we need to tell our patrons that we have.

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Footnotes

1 Bibliographical data in national bibliography entries : a report on descriptive cataloguing made for Unesco & IFLA : provisional abridged text / by Michael Gorman. (Document for examination / IFLA International Meeting of Cataloguing Experts, Copenhagn, 1969; no.2)

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vision:

Section: Cataloguing

132-CAT-3-E

International Bibliographic Filing Principles and Rules

A work item of the International Organization for Standardization: International Standard ISO 7154

by

Ernst KOHL

Director, Library Network Development Office
Administration of the Deutscher Bundestag
Bonn, Federal Republic of Germany

5 cm

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be presented orally ☒
discussion only ☒

Bibliographic filing begins where alphabetical cataloguing, subject cataloguing, and classification end, which means that it is the task of filing to arrange the products of cataloguing, indexing, and classification in a comprehensible sequence within a catalogue or a bibliography as well as on a display. In a data-processing environment ordered sequences of bibliographic data are still a requirement, e.g. when an online search in a database produces more than one work or when inverted files are to be displayed.

Various filing principles exist for the filing of bibliographic materials. In consequence, filing rules are necessary which have the task of determining which of these principles are to be applied in which bibliographic circumstances. The relationship between bibliographic filing principles and bibliographic filing rules is demonstrated by EXAMPLES 1 and 2.

EXAMPLE 1 shows the arrangement of main entries in an alphabetical catalogue for works of Charles Dickens. The entries catalogued according to the Anglo-American Cataloguing Rules (AACR2) are filed on the one hand according to the British (BLAISE) Filing Rules (EXAMPLE 1.1) and on the other hand according to the American ALA Filing Rules (EXAMPLE 1.2). The British Filing Rules distinguish titles by class of title, the individual classes having a specific filing value:

- collective titles file as a group before bibliographic titles, i.e. before uniform titles and titles proper.

Within their groups the titles file according to different filing criteria:

- collective titles file according to a classified order;
- bibliographic titles file according to alphabetical order.

The ALA arrangement of the same entries, on the other hand, shows a rejection of two of the three bibliographic filing principles applied by the British BLAISE Filing Rules, viz:

- distinction of titles by class of title, and
- classified order.

Instead, all titles file in a single sequence in alphabetical order.

EXAMPLE 2 shows arrangements of alphabetical subject entries. The Library of Congress Filing Rules (EXAMPLE 2.1) distinguish subject subdivisions by class, the individual classes, again, having filing values:

- period subdivisions file before
- form and topical subdivisions which, in turn file before
- geographical subdivisions.

In the British National Bibliography (Subject Index) (EXAMPLE 2.2), subject subdivisions are also distinguished by class, but the filing values attached to the individual classes are different, viz.

- form subdivisions file before
- period subdivisions which, in turn, file before
- topical and geographical subdivisions.

Efforts of standardization of bibliographic filing rules

The EXAMPLES are taken from the Anglo-American library community to demonstrate that common cataloguing rules do not by necessity result in common filing rules. There are reasons to believe that the variety of different filing rules is even greater than the variety of different cataloguing rules. In these circumstances it is not surprising that international organizations, e.g. the International Federation of Library Associations and Institutions (IFLA) and the International Organization for Standardization (ISO), have attempted to initiate efforts towards a greater uniformity of filing rules for library catalogues and bibliographies, the more so, since filing rules for international organizations are necessary as well.

The definition of international standard bibliographic filing rules was contained in the programme of work of both the IFLA UBC Office and the ISO Technical Committee 46 which is concerned with standardization in the field of documentation. The IFLA UBC Office expressly left it to ISO/TC 46

to take the lead while offering its support, and in this connection I, as the chairman of the ISO working group, would like to express my appreciation of the assistance given to the working group by the UBC Office.

ISO/TC 46 made several attempts of tackling bibliographic filing rules. Eventually, after a reconstitution in 1978, the working group (ISO/TC 46/SC 4/WG 3) proposed to the ISO/TC 46 Plenary in Warsaw in 1979 to try and elaborate two documents:

- one collocating the existing principles for the filing of bibliographic materials, and
- another one recommending international bibliographic filing rules for international organizations, bibliographies, and databases, which should also serve as a model set of rules for any national filing rules to be defined in the future.

The working group in which librarians and documentalists from twelve countries and international organizations were represented, subsequently held four meetings:

- in Munich in 1979;
- in London in 1980;
- in Nanjing in 1981 and
- in Vienna in 1983.

At the Munich meeting a document analyzing existent bibliographic filing principles was produced, and it was decided to transform it into an International Standard on bibliographic filing principles. According to the ISO Directives an International Standard has to pass two stages before being accepted for International Standard: that of DP (Draft Proposal) and that of DIS (Draft International Standard). At both stages ISO Member Bodies take a formal vote on the proposed Standard with four alternatives offered to them:

- approval;
- approval with comments;

- disapproval (reasons have to be given);
- abstention.

If there are more than two disapprovals, the document is usually not promoted to the next stage. Both comments and reasons given for disapproval have to be considered by the working group, before the document can be put to another vote.

ISO/DP 7154, Documentation - Bibliographic Filing Principles, was submitted for voting in May, 1980. There was only one disapproval (from France). At its meeting in Nanjing in China in 1981 the working group was, therefore, in a position to promote the Bibliographic Filing Principles to the stage of DIS. ISO/DIS 7154 was submitted for voting in November, 1982. There were 23 approvals or approvals with comments, amongst them the major bibliographic nations, the USSR, the United Kingdom, France, the Federal Republic of Germany, China, and Japan. The only disapproval (from the United States) was given for technical reasons. At its meeting in Vienna in 1983, the working group succeeded in removing this technical obstacle, the United States subsequently changing their vote to approval. The working group was, therefore, in a position to finalize work on the Bibliographic Filing Principles, which will be published as International Standard ISO 7154.

The second document, international standard bibliographic filing rules, was drafted at the London meeting of the working group in 1980 and put to a vote as an Annex to the Bibliographic Filing Principles. Although the document received substantial support, the Plenary of ISO/TC 46 decided in Nanjing in 1981 to have the ISO Bibliographic Filing Rules as they came to be called published as an International Technical Report and not as an Annex to the Bibliographic Filing Principles. The ISO Central Secretariat, however, decided to publish the ISO Bibliographic Filing Rules as Part 2 of the International Standard ISO 7154. ISO/DP 7154/2 was then submitted for voting, in November, 1981, and received wide acceptance. The only disapproval, for the technical reason that a Plenary decision had been overruled, was sent in by the United States. After some nego-

tiations with the ISO Central Secretariat and the TC 46 Secretariat the working group could recommend to the Plenary of ISO/TC 46 to decide that the ISO Bibliographic Filing Rules should be published simultaneously with the Bibliographic Filing Principles as an International Technical Report.

International Standard ISO 7154

ISO 7154, Documentation - Bibliographic Filing Principles, defines the principles which may be applied to the filing of bibliographic materials. The Technical Report ISO Bibliographic Filing Rules selects from these principles those which are most commonly used by the individual national bibliographic filing rules, and recommends them for international use.

As may be seen from TABLE 1, the Bibliographic Filing Principles contain

- a standardized filing terminology (in the two ISO languages English and French);
- principles for the presentation of filing information;
- principles for the construction of filing sequences;
- principles for the filing of the individual filing units.

As far as the filing terminology is concerned 29 filing terms are defined and standardized. To give some examples:

(1) The different filing criteria of alphabetical, canonical, classified, and numeric order, and precedency by class and type distinctions are defined.

(2) The filing unit which consists of the name of a person or corporate body or of a title, which is called 'field' in the Library of Congress Filing Rules, 'filing area' by the British BLAISE Filing Rules, and 'filing block' by the German RAK rules, is standardized as 'filing area'.

The principles of presentation of filing information stress, for instance, the principle of 'file-as-is' as against the principle of 'file-as-if'. As illustrated by EXAMPLE 3, this principle means that a number written in numerals is filed numerically whereas a number written in letters is filed alphabetically. If it is intended to file a number written in letters nu-

merically, the numeric expression must be added to the filing information to substitute for the alphabetic expression, an example being given by ALA filing rule 8.7.2 (see EXAMPLE 3).

Another principle laid down in this part of ISO 7154 is that non-filing units, e.g. initial articles in titles, should be marked, e.g. by enclosing them, as is done by the German bibliographic exchange format MAB1, within the logical NOT sign, as illustrated in EXAMPLE 3.

The third part of ISO 7154 is concerned with the construction of the filing information. The entire filing information is analyzed as consisting of a sequence of different filing units which belong to different hierarchical filing levels, as presented in TABLE 2 and illustrated in EXAMPLE 4. As the majority of national filing rules consulted prefer a four-level filing hierarchy, the four-level hierarchy is standardized by the ISO Bibliographic Filing Rules. In fact, the difference between the concepts of four- and five-level bibliographic filing hierarchies which is the maximum of filing levels found in the filing rules of countries using alphabetical scripts, is more or less theoretical and has no influence on actual bibliographic filing practices. In a five-level filing hierarchy, the space is regarded as a filing signal delimiting filing words, whereas in the four-level filing hierarchy the space is regarded as a filing character which, according to the filing value given to it, precedes numbers and letters.

Filing entries

The filing principles of ISO 7154 state that the filing entry which contains the entire filing information, is composed of filing areas. Which of the bibliographic elements of an entry are selected for filing areas an in which sequence, may be different according to the type of entry. The Bibliographic Filing Principles decree that filing rules must define which types of entry they accept, and determine the priorities among the established types of entry.

The ISO Bibliographic Filing Rules specify, on the basis of the most common use, 13 types of entry, and determine the sequence of filing areas for each

type, taking into account the filing requirements of both alphabetical and subject catalogues as well as of dictionary catalogues. Six types of entry (as presented in TABLE 3) belong to the alphabetical catalogue and seven to the subject catalogue.

EXAMPLES 5 and 6 show the sequences of filing areas as determined by the ISO Bibliographic Filing Rules for specific explanatory references and for main entries, and hint at filing signals, i.e. indicators which identify types of entries.

Some types of entry have sub-types, e.g. five sub-types with different sequences of filing areas are defined for added entries, as listed in TABLE 4.

The ISO Bibliographic Filing Rules determine the priorities among the established 13 types of entry in the frame of a dictionary catalogue. In a catalogue situation with separate alphabetical and subject catalogues, the order of priorities remains the same for the alphabetical catalogue (see TABLE 5), but in the subject catalogue, entries for works on individual works of personal or corporate authors change priorities by filing after subject entries for personal and corporate authors.

The ISO Bibliographic Filing Rules define as a general filing rule for filing entries that an entry with fewer filing areas is filed before a filing entry with more filing areas the first one(s) of which are identical with the filing entry with fewer filing areas, as illustrated by EXAMPLE 7.

Filing areas

The second-largest filing unit of the filing hierarchy is the filing area. The filing area contains an independent part of the entire filing information, e.g. the name of a person or of a corporate body, a title, date of publication, place of publication, etc. As to its composition, the Bibliographic Filing Principles state that it is made up by sequences of filing sections. In addition, a filing qualifier may be added to a filing area. The sequence of filing sections has to be specified by filing rules, as it is different

from one type of filing area to another. Priorities may be established by both class and type distinctions.

Within this frame set by the Bibliographic Filing Principles the ISO Bibliographic Filing Rules specify the filing requirements for filing areas. Five types of filing areas are distinguished as listed according to the priorities established by the ISO Bibliographic Filing Rules in TABLE 6. For each type the sequence of filing areas is determined as illustrated by EXAMPLE 8.

In defining the filing rules for filing areas the ISO Bibliographic Filing Rules prefer simpler arrangements than many existing national filing rules determine, taking into account that more and more, filing will also be done by data-processing machines. Therefore, distinction by class is rejected by the ISO Bibliographic Filing Rules which means, for instance, that collective titles and bibliographic titles file in one group, as in the ALA Filing Rules. Subject subdivisions, in consequence, also file in one group instead of being arranged, by class distinction, in three groups the filing within each group being according to the filing criteria of alphabetical and numeric order, as ruled by the Library of Congress Filing Rules. Classified and canonical arrangements, e.g. for sacred scriptures, are rejected in favour of pure alphabetical order, which is certainly more computer-inclined.

Three filing rules for filing areas are defined by the ISO Bibliographic Filing Rules :

- a filing area with fewer filing sections is filed before a filing area with more filing sections the first one(s) of which are identical with the filing area with fewer filing sections;
- a filing area to which filing qualifiers are attached files after an identical filing area without filing qualifiers;
- identical filing areas without filing qualifiers or with identical filing qualifiers are to be distinguished by type of filing entry and filed according to the priorities established for the individual types of entry. This rule is illustrated by EXAMPLE 9.

Filing sections

The filing section, according to the definition of the Bibliographic Filing Principles is a logical subdivision of the entity contained in the filing area, e.g. the family name and the forename(s) as parts of the filing area of a personal name are both filing sections. A filing section is composed of filing characters. In addition, filing qualifiers may be added to filing sections. Priorities may be established by both class and type distinctions.

Within this frame the ISO Bibliographic Filing Rules again try to define relatively simple rules. Again, all distinctions by class are rejected as shown by EXAMPLE 10.

Three filing rules are defined by the ISO Bibliographic Filing Rules:

- a filing section with fewer filing characters is filed before a filing section with more filing characters the first one(s) of which are identical with the filing section with fewer filing characters;
- identical filing sections are to be distinguished by type of filing area and filed according to the priorities established for the individual types of filing area. This rule is illustrated by EXAMPLE 11;
- a filing section to which filing qualifiers are attached files after an identical filing section without filing qualifiers.

Filing characters

The filing character is the lowest filing unit of the filing hierarchy. The Bibliographic Filing Principles specify four classes of filing characters:

- arrangement codes;
- non-alphanumeric signs;
- numbers written as numerals;
- letters.

The Bibliographic Filing Principles decree that priorities have to be establish-

ed for the individual classes, i.e. it must be laid down in filing rules whether, for instance, numbers written as numerals file as a group before all letters or vice versa. For the individual classes of filing characters various filing criteria are specified by the Bibliographic Filing Principles.

As far as filing entries, filing areas, and filing sections were concerned it was possible for an international working group consisting of librarians and documentalists to agree - certainly after debates and by way of compromise - on common filing rules, because librarians and documentalists of all nations are concerned with filing the same sort of material. As a consequence these parts of the ISO Bibliographic Filing Rules can be taken over and applied - without any or with slight modifications - by the individual national filing rules. Characters, however, are a common property, and in filing characters, librarians and documentalists are not sovereign. They should certainly not deviate from the filing practices of the general public.

Which are the difficulties? First of all, there are different scripts and even different kinds of scripts:

- logographic or logo-syllabic scripts, e.g. Chinese with 6763 graphic characters officially registered by the People's Republic of China National Standard GB 2312 (see EXAMPLE 12);
- syllabic scripts, e.g. Japanese Hirakana and Katakana;
- phonemic scripts, e.g. Cyrillic with 33 letters, Greek with 24 letters, or Latin with 26 letters.

With the consent of the Chinese delegates the working group concentrated on the latter kind of scripts, for which conventional orders exist which people can memorize because the number of letters of these scripts is limited. Therefore, alphabetical order can be the filing criterion for phonemic scripts, but for Chinese, for instance, other criteria have to be applied. It was agreed that non-alphabetic scripts will be dealt with in a supplement to the Technical Report 'ISO Bibliographic Filing Rules'.

There are many phonemic or alphabetic scripts. An international ISO working group should certainly not prescribe the priority of any one script, e.g. Latin. But as Latin is used by many international organizations for which

international bibliographic filing rules are needed, the ISO Bibliographic Filing Rules, with the consent of the USSR, exemplify the filing rules for letters by referring to the Latin script.

The 26 Latin letters file in the commonly accepted alphabetical order from a to z. Special letters of languages written in Latin script, have to be converted, for filing, into one or more of the 26 Latin letters as may be seen from TABLE 7.

Ligatures file as if the component letter parts were individual letters irrespective of national practices as demonstrated by TABLE 8.

Letters to which accents or diacritical marks are added - below, above, or striking the letter - file as if no graphic addition existed, again irrespective of national practices (see TABLE 8).

Letters are the most important class of filing characters for bibliographic materials. But there are other classes, too. Numbers written as numerals file according to numeric order in the ordinal sequence of positive integers. Decimal parts of numbers are filed in decimal order. Dates represented by numerals are filed either in chronological order (e.g. in alphabetical catalogues) or in reverse chronological order (e.g. in subject catalogues). As far as priorities by class are concerned, the ISO Bibliographic Filing Rules determine that numbers file before letters as this is the preferred order of most nations.

As to the third class of filing characters, non-alphanumeric signs, e.g. the hyphen, the ampersand, or the space, many national bibliographic filing rules, e.g. the British BLAISE and the American ALA rules, define specific orders for these auxiliary signs. The ISO Bibliographic Filing Rules, however, hold that in the interest of the user it is certainly easier to ignore all non-alphanumeric signs in filing except the space which according to the ISO Bibliographic Filing Rules is to be filed before numbers written as numerals. These ISO rules for non-alphanumeric signs are particularly recommended to national filing rules, as the different treatment of non-alphanumeric signs is a concern for any li-

brarian who has to consult various national bibliographies.

The fourth class of filing characters defined by the ISO Bibliographic Filing Rules are arrangement codes for type distinctions, which as a class file before the space.

Practical applications of the ISO bibliographic filing rules

To whom may the ISO Bibliographic Filing Rules be of use? First of all, they provide international organizations with filing rules which, compared with many national bibliographic filing rules, are rather simple to handle and inclined to computer sorting:

- there are no classified or canonical arrangements, and
- non-alphanumeric signs with the exception of the space, are ignored in filing.

On the other hand, the ISO Bibliographic Filing Rules are also useful in serving as a model set of bibliographic filing rules to nations which are about to define national filing rules. To give two examples: Sweden used the Draft ISO Technical Report for drafting their filing rules in 1981. The other example is China which as a first step for defining national filing rules translated the Bibliographic Filing Principles and the ISO Bibliographic Filing Rules into Chinese as demonstrated by EXAMPLES 13 and 14.

In conclusion, I would, therefore, like to express my hope that the ISO Technical Report 'ISO Bibliographic Filing Rules' will be a catalyst in bringing about greater uniformity in bibliographic filing in the future.

Scope and field of application	(1)	Objet et domaine d'application
References	(2)	Références
Definitions	(3)	Définitions
Principles of presentation of filing information	(4)	Principes régissant la présentation de l'information de classement
Principles of construction of filing sequences	(5)	Principes de construction des séquences de classement
Principles of filing	(6)	Principes de classement

TABLE 1

Table of contents of ISO 7154
Documentation - Bibliographic Filing Principles

Table des matières de l'ISO 7154
Documentation - Principes de classement bibliographique

filing entry	notice de classement
filing area	zone de classement
filing section	section de classement
filing word	mot de classement
filing character	caractère de classement

TABLE 2

Hierarchy of filing units
in descending order from highest to lowest

Hiérarchie des unités de classement
par ordre décroissant, de la plus élevée à la plus basse

general explanatory references	renvois justificatifs généraux
see references	renvois voir
see also references	renvois voir aussi
specific explanatory references	renvois justificatifs particuliers
main entries	notices principales
added entries	notices secondaires

TABLE 3

Types of entry of the alphabetical catalogue

Genres de notice du catalogue alphabétique

added entries for joint authors and for shared and mixed authorship	(1)	notices secondaires pour coauteurs et pour responsabilités multiples et diverses de personnes et de collectivités
added entries for other contributing persons and corporate bodies	(2)	notices secondaires pour autres personnes et collectivités ayant collaboré à un ouvrage
name-title added entries	(3)	notices secondaires nom-titre
title added entries	(4)	notices secondaires au titre
series added entries	(5)	notices secondaires sous la collection

TABLE 4

Sub-types of added entries

Sous-genres de notices secondaires

general explanatory references	renvois justificatifs généraux
file before	sont classés avant
see references	renvois voir
which file before	qui sont classés avant
see also and specific explanatory references	renvois voir aussi et renvois justificatifs particuliers
which file before	qui sont classés avant
main and added entries	notices principales et notices secondaires

TABLE 5

Order of precedence for types of entry

Ordre de priorité des notices de classement

person entered under given name	personne entrée au prénom
person entered under surname	personne entrée au nom de famille
corporate body	collectivité
subject term	terme dénotant le sujet
title	titre

TABLE 6

Types of filing areas

Genres de zones de classement

special letters of languages written in Latin script are converted, for filing, into one or more of the 26 Latin letters				les lettres spéciales dans les langues écrites en écriture latine sont converties, aux fins du classement, en une ou en plusieures lettres latines
Icelandic	ð	=	d	islandais
Turkish dark	ı	=	i	turc postérieur
Greenlandic	ĸ	=	k	groenlandais
Lappish	ŋ	=	n	lapon
German	ß	=	ss	allemand
Icelandic	þ	=	th	islandais

T A B L E 7

Filing of special letters
according to the ISO Bibliographic Filing Rules

Classement des lettres spéciales
d'après les Règles de classement bibliographique de l'ISO

letter/lettre	filing according to classement d'après ISO	national filing rules règles de classement nationales
å	a	Swedish rules: after / règles suédoises: après } z
ä	a	German rules: / règles allemandes: } ae Swedish rules: after / règles suédoises: après } å
æ	ae	Danish rules: after / règles danoises: après } z
Ĳ	ij	Dutch rules: / règles hollandaises: } y
ø	o	Danish rules: after / règles danoises: après } æ
ö	o	German rules: / règles allemandes: } oe Swedish rules: after / règles suédoises: après } ä Hungarian rules: after / règles hongroises: après } o
ő	o	Hungarian rules: after / règles hongroises: après } ö

TABLE 8

Filing of ligatures and letters with marks

Classement des ligatures et des lettres avec ajouts graphiques

Dickens, Charles
[Works]
The works of Charles Dickens / ed. by Richard Garnet. - London, 1900.

Dickens, Charles
[Selections]
Character portraits from Dickens / selected and arranged by Charles Welsh. - Boston, Mass., 1907.

Dickens, Charles
[Correspondence]
The letters of Charles Dickens / ed. by his sister-in-law and his eldest daughter. - New York, 1879.

Dickens, Charles
[Poems]
The poems and verses of Charles Dickens / coll. by F. G. Kitton. - New York, 1903.

Dickens, Charles
The battle of life. - London, 1846.

Dickens, Charles
[David Copperfield]
The personal history of David Copperfield. - London, 1939.

E X A M P L E 1.1

Arrangement of main entries in an alphabetical catalogue according to the British BLAISE Filing Rules, App. B

Classement de notices principales d'après les BLAISE Filing Rules, App. B

Dickens, Charles
The battle of life. - London, 1846.

Dickens, Charles
[Correspondence]
The letters of Charles Dickens / ed. by his sister-in-law and his eldest daughter. - New York, 1879.

Dickens, Charles
[David Copperfield]
The personal history of David Copperfield. - London, 1939.

Dickens, Charles
[Poems]
The poems and verses of Charles Dickens / coll. by F. G. Kitton. - New York, 1903.

Dickens, Charles
[Selections]
Character portraits from Dickens / selected and arranged by Charles Welsh. - Boston, Mass., 1907.

Dickens, Charles
[Works]
The works of Charles Dickens / ed. by Richard Garnet. - London, 1900.

EXAMPLE 1.2

Arrangement of main entries in an alphabetical catalogue according to the ALA Filing Rules, 1980

Classement de notices principales d'après les ALA Filing Rules, 1980

GERMAN LITERATURE - 18TH CENTURY

GERMAN LITERATURE - 20TH CENTURY

GERMAN LITERATURE - ANTHOLOGIES

GERMAN LITERATURE - BIBLIOGRAPHIES

GERMAN LITERATURE - INFLUENCE OF BIBLE

GERMAN LITERATURE - SERIALS

GERMAN LITERATURE - WOMEN WRITERS

GERMAN LITERATURE - BAVARIA

GERMAN LITERATURE - SWITZERLAND

EXAMPLE 2.1

Alphabetical subject entries
according to the Library of Congress Filing Rules, 1980

Classement de notices-matières
d'après les Library of Congress Filing Rules, 1980

GERMAN LITERATURE - ANTHOLOGIES

GERMAN LITERATURE - BIBLIOGRAPHIES

GERMAN LITERATURE - SERIALS

GERMAN LITERATURE - 18TH CENTURY

GERMAN LITERATURE - 20TH CENTURY

GERMAN LITERATURE - BAVARIA

GERMAN LITERATURE - INFLUENCE OF BIBLE

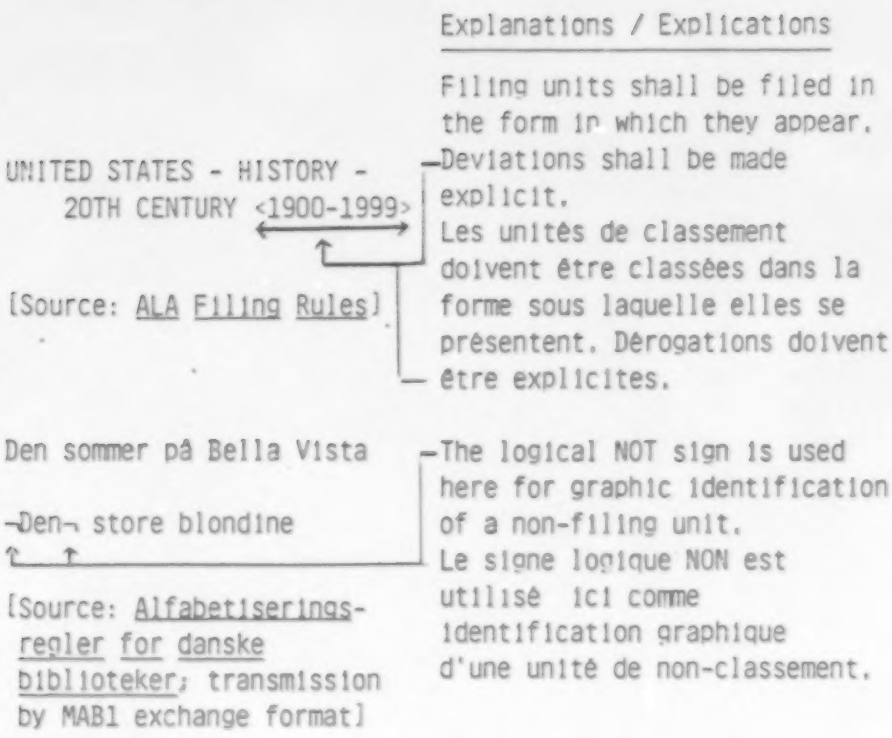
GERMAN LITERATURE - SWITZERLAND

GERMAN LITERATURE - WOMEN WRITERS

EXAMPLE 2.2

Alphabetical subject entries
according to the British National Bibliography

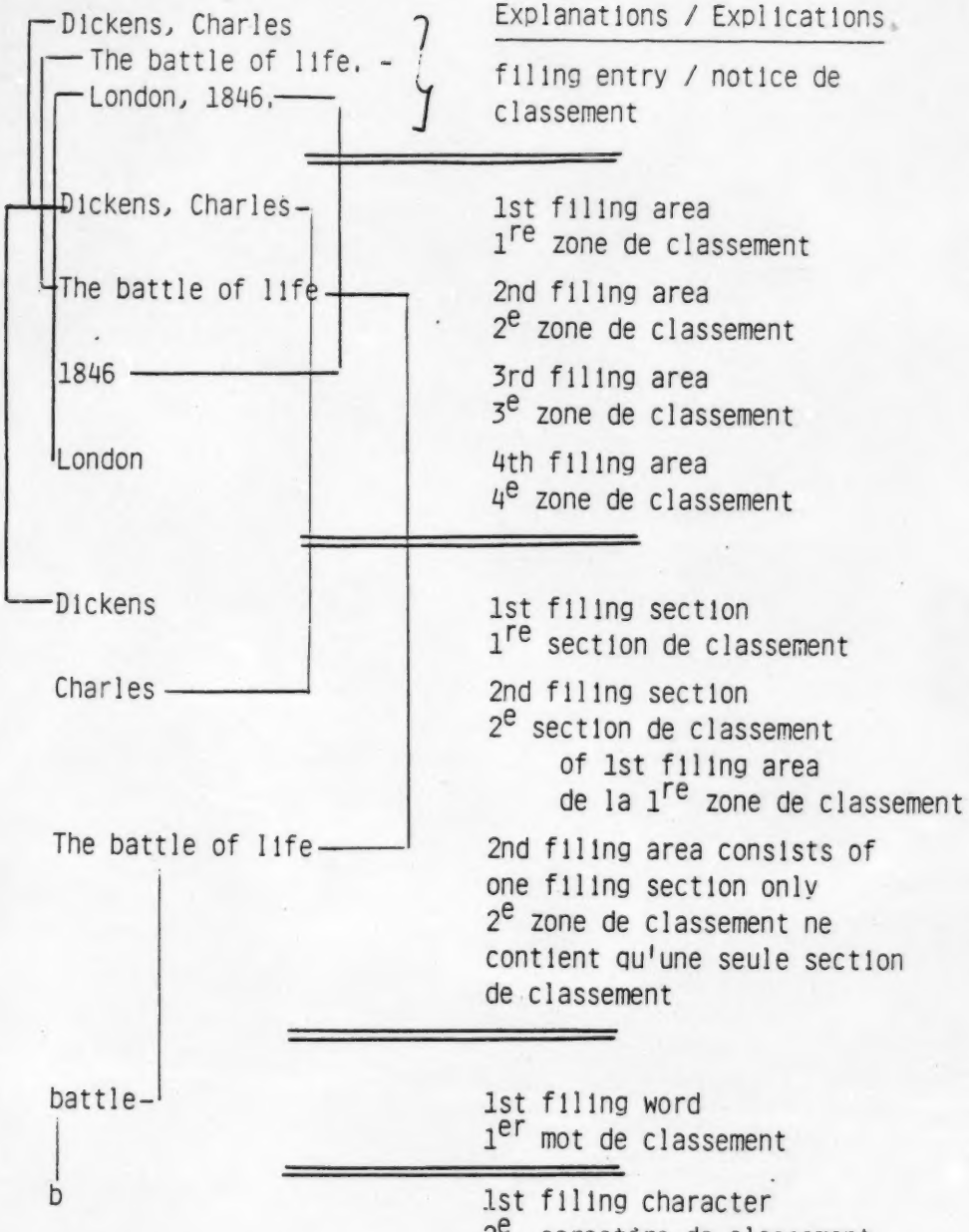
Classement de notices-matières
d'après la British National Bibliography


Explanations / Explications
Filing units shall be filed in the form in which they appear. Deviations shall be made explicit.
Les unités de classement doivent être classées dans la forme sous laquelle elles se présentent. Dérogations doivent être explicites.
UNITED STATES - HISTORY - 20TH CENTURY <1900-1999>
[Source: ALA Filing Rules]
Den sommer på Bella Vista
¬Den¬ store blondine
[Source: Alfabetiserings-regler for danske biblioteker; transmission by MAB1 exchange format]
The logical NOT sign is used here for graphic identification of a non-filing unit.
Le signe logique NON est utilisé ici comme identification graphique d'une unité de non-classement.

EXAMPLE 3

Principles of presentation of filing information

Principes régissant la présentation de l'information de classement


Dickens, Charles
The battle of life. -
London, 1846.
Explanations / Explications
filing entry / notice de classement
Dickens, Charles
1st filing area
1re zone de classement
The battle of life
2nd filing area
2e zone de classement
1846
3rd filing area
3e zone de classement
London
4th filing area
4e zone de classement
Dickens
1st filing section
1re section de classement
Charles
2nd filing section
2e section de classement
of 1st filing area
de la 1re zone de classement
The battle of life
2nd filing area consists of one filing section only
2e zone de classement ne contient qu'une seule section de classement
battle-
1st filing word
1er mot de classement
b
1st filing character
2e caractère de classement

EXAMPLE 4

	Explanations / Explications
American Material Handling Society	1st filing area 1re zone de classement
see also the later heading	filing signal signal de classement
Material Handling Society of North America	2nd filing area 2e zone de classement
Westminster Bank	1st filing area 1re zone de classement
The Westminster Bank and the National Provincial Bank merged in 1969 to form the National Westminster Bank. Works of these bodies are entered under the name used at the time of publication.	not a filing area ne constitue pas une zone de classement

EXAMPLE 5

Filing areas of
specific explanatory references

Zones de classement
des renvois justificatifs particuliers

	Sequence of filing areas Séquence des zones de classement
Dickens, Charles [David Copperfield] The personal history of David Copperfield. - London, 1921.	(1) DICKENS ... (2) DAVID ... (3) 1921 (4) LONDON
Dickens, Charles David Copperfield. - London, 1939.	(1) DICKENS ... (2) DAVID ... (3) 1939 (4) LONDON
Dickens, Charles [Works] The works of Charles Dickens / ed. by Richard Garnet. - London, 1900 - 1908. Vol. 1: Poems. - 1900.	(1) DICKENS ... (2) WORKS (3) 1900 (4) LONDON (5) 1 or (1) DICKENS ... (2) WORKS (3) LONDON (4) 1 (5) 1900

If it is necessary to distinguish further, filing may be by the publisher and by edition statement.

S'il est nécessaire de distinguer davantage, on peut le faire en classant selon l'éditeur et la mention d'édition.

EXAMPLE 6

Filing areas of main entries

Zones de classement des notices principales